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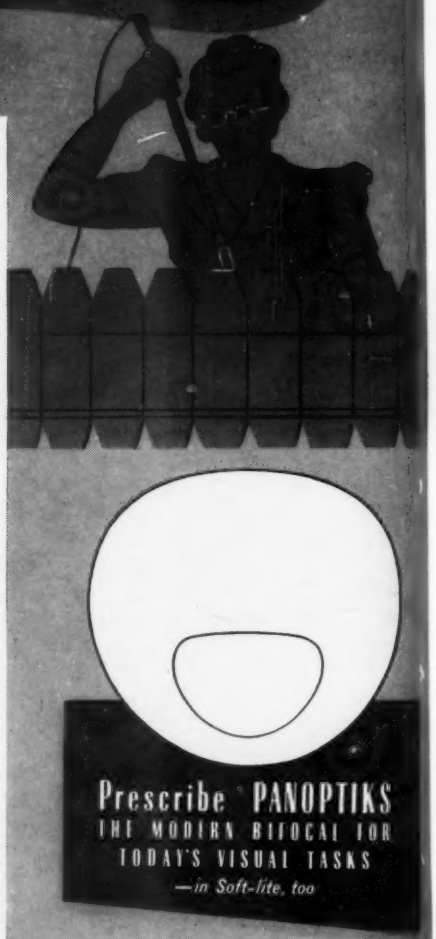

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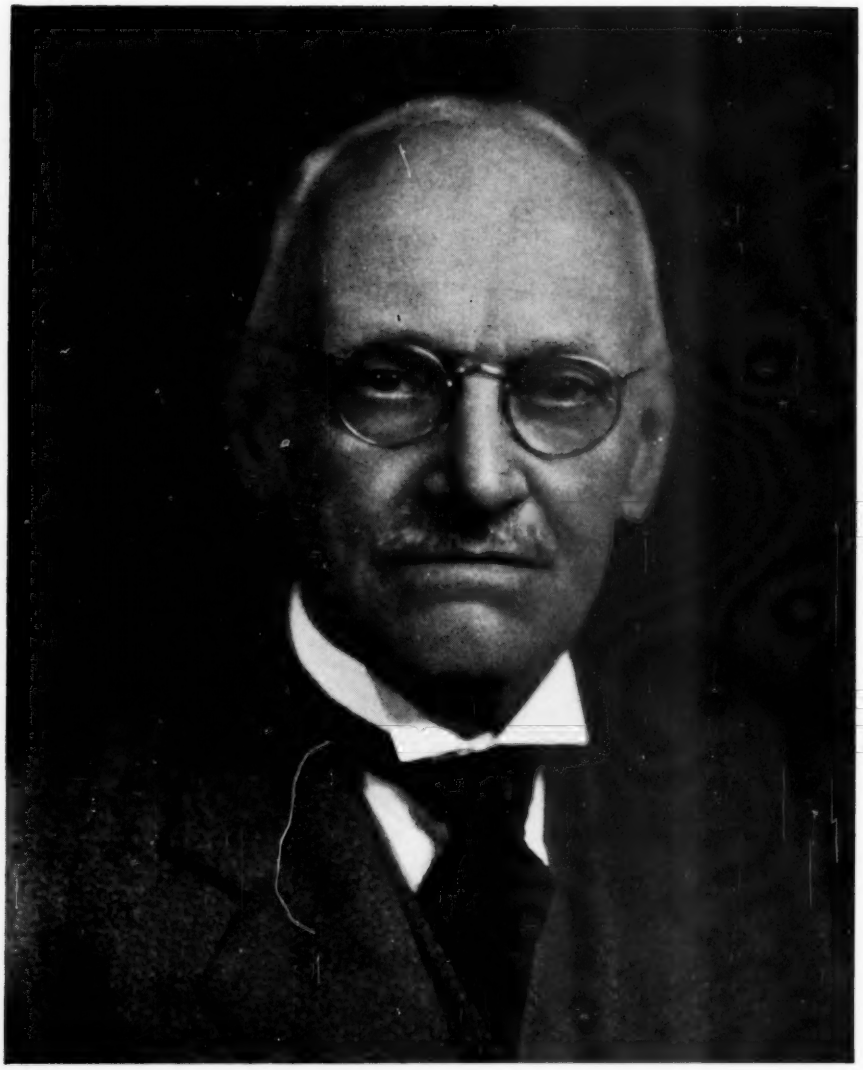


Edward Jackson, M.D., 1856-1942

AMERICAN JOURNAL OF OPHTHALMOLOGY

VOLUME 26 JANUARY, 1943 NUMBER 1

EDWARD JACKSON, STUDENT AND TEACHER

WILLIAM H. CRISP, M.D.
Denver

Edward Jackson has attended his last medical meeting.

At the American Academy of Ophthalmology and Otolaryngology, in Chicago, October 11th to 14th, in his eighty-seventh year, he conducted a "conference" on office management. He had been apparently in his usual cheerful and vigorous spirit, but, at the end of the conference hour, he remarked that this was probably his last appearance in such a capacity and that he had found the effort a little to much for him.

He reached home in Denver on October fifteenth. Miss Mabel D. Anderson, his capable and loyal secretary for forty years, says that he seemed worn out from the trip to Chicago. About a week later he walked into the office of an old medical friend in Denver and asked to be "looked over," because that morning he had felt dizzy on rising. No other complaint was recorded. The examiner found a high blood pressure and a pulse rate of thirty; and at once diagnosed heart block, due to myocardial disease involving the bundle of His.

In the morning of October twenty-seventh, Dr. Jackson collapsed after taking his habitual shower bath. When medical aid was obtained the pulse rate was twenty and the respiration of the Cheyne-Stokes type. Dr. Jackson gradually passed into semi-coma, and died at 3.30 a.m. on October twenty-ninth.

. . .

Edward Jackson was born at West Goshen, Chester County, Pennsylvania, on March 30, 1856. He was the son of Halliday and Emily (Hoopes) Jackson.

In the early part of the seventeenth century the Jackson family lived in Lincolnshire, England, but they were among the colonists who were settled in Ireland by Oliver Cromwell after his victorious campaign in that country. Two generations later, Edward Jackson's direct ancestor migrated to the young colony of Pennsylvania.

The family were loyal Quakers. Edward Jackson was at first a member of the Birmingham Monthly Meeting of the Society of Friends (West Chester, Pennsylvania), but later joined the Unitarian Church, and was an active member of the Unitarian Church in Denver up to the time of his death. In 1939, however, he obtained renewal of his membership in the Birmingham Friends Meeting, and on his numerous journeys from Denver to the eastern states he made a practice of planning to be present on Sunday with the Birmingham Friends.

In 1874 he graduated from Union College, New York, with the degree of Bachelor of Science in civil engineering.

For a short time, in the absence of other obligations, he travelled with Joseph Price, a close friend who later became famous as a Philadelphia surgeon; and the two friends worked for a time on an Iowa farm. Together they resolved to study medicine.

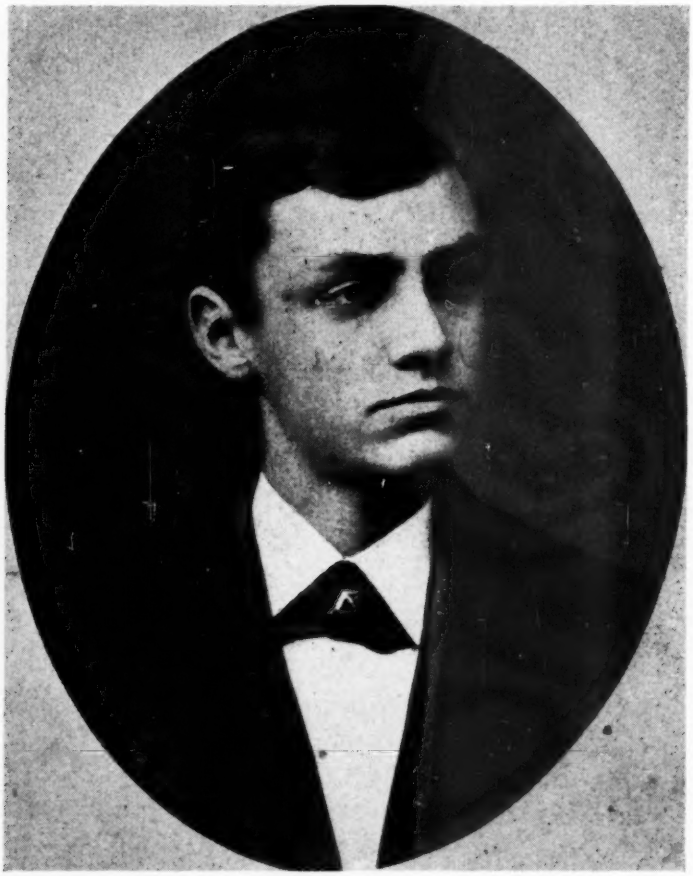
Jackson received his medical degree

from the University of Pennsylvania in 1878, and began practice at West Chester.

His practice of general medicine was interrupted by an attack of diphtheria which was followed by a somewhat prolonged period of postdiphtheric paralysis involving the leg muscles and ocular accommodation. This was the beginning of his study of ophthalmology. During his incapacity he familiarized himself "through and through" with Donders's monumental work on refraction.

Jackson's early professional colleagues in Philadelphia included such men as L. Webster Fox, George C. Harlan, William F. Norris, Charles A. Oliver, B. Alexander Randall, and Samuel D. Risley.

The young recruit soon found plenty of institutional opportunities. He became attached to Wills Hospital and the Philadelphia Polyclinic and he appears to have played an important part in the editorship of the medical journal published by the staff of the latter institution. He was elected Professor of Ophthalmology in the Philadelphia Polyclinic in 1888, and Surgeon to Wills Hospital in 1890.



Edward Jackson at the age of 18 years.

Two former members of the resident staff of Wills Hospital have sent interesting notations as to Jackson's activities in that institution.

Says Dr. Walter H. Parker: "Dr. Jackson was one of my chiefs at the Wills Eye Hospital and his popularity with the resident staff is well shown by the following incident. Dr. Jackson came to the hospital on an off day to see three cases of traumatic cataract that were on his service. While walking down the ward we met one of the surgeons who was on duty that day. Dr. Jackson asked him to see these three cases. After examining them, the surgeon who was on duty turned to me and said 'Why is it that Dr. Jackson has three traumatic cataract cases at one time while I have not seen one in years?' The facts were that these cases all came to the hospital out of clinic hours and were first seen by the house surgeon, who had the privilege of assigning such cases to the clinic of his choice. Because of Dr. Jackson's interest in the resident staff, they were all assigned to his clinic. Dr. Jackson always showed an interest in the resident staff and gave them more attention than any other member of the visiting staff."

Dr. Edward C. Ellett adds: "He was the last living one of my Chiefs at Wills. I was there from May, 1892, to May, 1893, which is just fifty years ago. Dr. Jackson was at that time about thirty-five and the youngest full surgeon on the Staff. He was always a man of great industry, patience, and skill, and probably due to the latter it was a matter of comment between the members of the House Staff how much more manipulation the eyes that he operated on seemed to stand than other eyes did. He was always ready with a serious and well-considered answer to any questions which we would ask him."

In 1890, Jackson's initiative resulted in the formation of the Section on Ophthalmology of the College of Physicians of Philadelphia.

In 1878 he married Jennie L. Price. In 1894, Mrs. Jackson developed active tuberculosis, and the family, including three sons and two daughters, moved to Denver, Colorado. Mrs. Jackson died in 1896, and Jackson went back to Philadelphia with his children. But he feared the possibility that tuberculosis might show itself in the sons and daughters, and in 1898 the family settled in Denver. There, shortly afterward, Dr. Jackson married Emily Churchman.

Jackson, Fuchs, and Bribach on Chief Mountain, 1925.

Like many others who had moved to Colorado for health reasons, Jackson and his family were great enthusiasts for the recreational activities afforded by the

Rocky Mountains. Jackson himself, in 1912, became one of the first members of the Colorado Mountain Club, and with that Club he climbed a number of the highest peaks in Colorado. In 1925, on the occasion of a visit and lecture by Professor Ernst Fuchs to the members of the Colorado Ophthalmological Society, Jackson, in his Model-T Ford, drove Fuchs, Eugene Bribach, and the present writer from Denver to a point on the mountain highway about eleven thousand feet above sea level. We then proceeded on foot, Fuchs setting the pace, to the top of Chief Mountain (altitude 11,709 feet), one of the lesser Rocky Mountain peaks about thirty-five miles from Denver.

In 1905 Dr. Jackson became Professor of Ophthalmology in the Medical Department of Colorado University, a position which he held until he was placed on the emeritus list in 1921. In his later years, after giving up his heavier editorial responsibilities, he again took an active part in the work of the college clinic, and especially in the teaching of refraction.

. . .

Edward Jackson was above all an ardent and lifelong student and teacher. His enthusiasm for clinical observation and scientific discovery never flagged. His powers of concentration were exceptional. Even when, in his later years, he showed a frequent tendency to appear drowsy in medical meetings, he would surprise us all by suddenly arousing himself and taking an active and very pertinent part in discussion.

In a letter to the editor of the Journal of the American Medical Association, August 13, 1904, he tells us how he learned to concentrate on the lectures given during his medical course in the University of Pennsylvania (Journal of the American Medical Association, 1904, volume 43, page 483).

"If note-books are to be kept," he says, "they should be written outside of the lecture room. Briefly, the plan is to concentrate the whole attention on what the lecturer is saying, making a little special effort to notice the principal divisions or headings of his lecture and the order in which they are presented. Then, shortly after the lecture . . . the notes are to be written up from memory. If the teacher makes a practice of summarizing each day, at the beginning of his lecture, the matters presented the day before, the student may compare this summary with his notes. But when the lecture of the day begins the notes should be laid entirely aside."

Throughout life, he was the earnest champion of one cause after another. At medical meetings, his intellectual features, resonant voice, clear language, and impressive manner never failed to command a hearing. Even when, in the last few years of his life, those in close contact with him had occasion to regret subtle evidences of decline, a vigorous talk by Jackson on some favorite and familiar topic would often prove the outstanding feature of a scientific discussion.

During his medical youth in Philadelphia, we find him repeatedly urging liberalization of the Code of Ethics of the American Medical Association, or at least a liberalization of the current interpretation of that Code. There appears to have been a tendency to ostracize the followers of Hahnemann, even when they were graduates of otherwise well-conducted medical colleges. In the Medical News, 1889, volume 55, page 425 (the paper having previously been read before the Philadelphia County Medical Society) Jackson, while disclaiming the feeling which had led to an institution being named after Hahnemann, urged that mere graduation from such an institution should not disqualify its alumni from consultation with so-called regular physi-

cians. Jackson's paper was succeeded by one under the authorship of Solomon Solis-Cohen, then Professor of Clinical Medicine and Applied Therapeutics at the Philadelphia Polyclinic, who incidentally accused Jackson of "overlaying" the question with sophistry.

A further discussion of the Code in the Journal of the American Medical Association, 1893, volume 20, page 567, seems to have borne upon the question whether a physician who limited his practice to, or "specialized" in, a certain department of medicine should be allowed to announce that fact to his colleagues and the public.

As a serious refractionist, it is not surprising that what we now know as the optometry question engaged Jackson's attention at an early date. In the Medical and Surgical Reporter for 1896, volume 74, page 800, under the title "The profession, the opticians, and the public," he talks concerning rebates, specialists' fees, and related questions.

It seems that the situation forty-seven years ago was not very different from what we find today. Although admitting that the problem as encountered in Philadelphia was less acute than in any other large city he knew of, Jackson reported that there was in that city a refracting optician who claimed to refract people referred to him by two hundred of the city's doctors. Jackson had seen what appeared to be photographs of checks from a firm of opticians, representing the payment of such commissions to a member of the Philadelphia County Medical Society. He had offered to take upon himself "the unpleasant office of preferring charges," provided that those who claimed to know the facts would testify before the Censors of the Society; "but no one was willing to appear as a witness." One of the opticians came to him to threaten prosecution for libel; although, after being encouraged to make good his threat, "he never showed any inclination to pursue the matter further."

The same article makes the following significant statement, the purport of which was to appear again and again in Jackson's writings: "The great reason why people go to opticians to have their eyes fitted is that some doctors do not do any better work in this direction than the opticians."

The more he looked into the matter, the more the question of optometry appeared to be tied up with the problem of education for the practice of ophthalmology. In 1904, as president of the rapidly growing American Academy of Ophthalmology and Otolaryngology, he pointed out certain weaknesses in the whole medical situation with regard to ophthalmology. He thought it unfortunate that dentistry had developed so much outside of the recognized lines of the medical profession, and he suggested that perhaps our greatest debt to Helmholtz, Graefe, and Donders was the fact that ophthalmology had grown up within these lines. Particularly he emphasized a need for students trained "to painstaking accuracy in mathematical measurements."

Speaking on the same subject before the Section on Ophthalmology of the American Medical Association (see Journal of the American Medical Association, 1911, volume 57, page 265), we find him suggesting an amendment to optometry laws to prevent optometrists or opticians attaching to their names titles which might indicate that they were engaged in the treatment or diagnosis of diseases, defects, or injuries of the human eye, or to use any therapeutic measures other than glasses for the treatment of the human eye. Such a clause had been included in the optometry law of the State of Colorado, at Jackson's own instigation.

But in the same paper Jackson urged

that the most important thing the medical profession could do in this connection was to provide for adequate teaching of ophthalmology, "including optometry," in the medical schools, and thus to build up a definite class of practitioners especially trained to recognize and treat the defects and disorders of the eye.

After the reading of this paper, and upon Jackson's motion, the Section on Ophthalmology resolved to request the Council on Medical Education of the Association to consider the curriculum for such a course.

Searching for the solution of these problems, Jackson became an active propagandist in favor of certain activities which are now familiar parts of our professional life. Not only must provision be made for more systematic and basic training in ophthalmology, but some method must be established for testing and certifying to the efficiency of such training. Colleges must be induced to offer satisfactory instruction in ophthalmology, and especially in the basic studies of ocular anatomy, of histology and pathology, and of physiologic optics. Courses of study must also be organized for those already engaged in ophthalmic practice.

Within a few years after Jackson's paper before the Section, the suggestion as to examination and certification of ophthalmologists found fruition in the creation of the American Board for Ophthalmic Examinations (now the American Board of Ophthalmology), composed of three (later four) members of each of the representative national organizations in ophthalmology; namely, the American Ophthalmological Society, the American Academy of Ophthalmology and Otolaryngology, and the Section on Ophthalmology of the American Medical Association.

The work of that Board is familiar to us all. Jackson took a prominent part in the actual organization of the Board, he was its chairman from the time of preliminary organization until the end of 1919, and he continued for eleven years to act as a member of the Board. He never failed to attend one of the Board's meetings or examinations.

When, on October 8, 1939, the Board solemnly celebrated its twenty-fifth anniversary (the initial steps toward its official creation having been taken as early as 1914), Jackson was presented with an illuminated Testimonial, bearing the names of the other thirty "past and present members," and couched in the following language:

"The American Board of Ophthalmology on its twenty-fifth anniversary conveys its affectionate good wishes to Dr. Edward Jackson one of the original members and the leading figure in the group to which it owes its inception.

The Board presents this testimonial in recognition of the perseverance and adroitness with which he brought about a new epoch in postgraduate medical education in America."

In 1921, as editor of the American Journal of Ophthalmology, Jackson received from a professional colleague, since deceased, a letter which seemed to question the fairness of the American Board for Ophthalmic Examinations in regard to the granting of the Board's certificate to older members of the specialty. Jackson, always on the alert for texts around which to compose his comments on medical questions, took the letter as the basis for an editorial in which he laid down hypothetical principles for the conduct of any such examining board.

There are now fourteen examining boards representing as many medical and surgical specialties. The principles laid down by Edward Jackson's editorial in 1921 (American Journal of Ophthalmology, volume 4, page 55) will be found

Drawn by W. H. Crisp from a photograph

Edward Jackson

to apply very well to the whole system as now coördinated under the watchful eye of the Council on Education of the American Medical Association.

The extent, he says, of the benefits to be derived from such examinations "depends on the confidence that their colleagues in the specialty, the general medical profession, and the public feel in the justness and discrimination of the decisions of those who conduct such examinations . . . it is with men already established in special practice that such examiners find it most difficult to deal with complete fairness. . . . The good-natured man, who would like to see everybody pleased, is liable to grant the certificate where there is doubt of its being deserved. The man with a strong confidence in his own uprightness, and lacking sympathy for others, is likely to do injustice in the opposite direction. . . . The Board for Ophthalmic Examinations is created to pass on knowledge and skill for ophthalmic practice, and ethical fitness for the office of professional adviser. Narrowness or breadth of education outside of this, a quarrelsome disposition, or an agreeable plausible manner, some public service or an exhibition of meanness not connected with the professional relation, should not determine the granting or withholding of a certificate. . . . It will be the duty of these examiners to help elevate the standard of the profession, . . . by recognizing defects in education among the older men who grew up under a most defective educational system, or absence of system, encouraging them to get added training they need; . . . by reducing to a minimum the effect of their personal prejudices and tastes; and exercising that charity for earlier errors of those who promise better things, that their own defects of judgment must ask of the profession they serve."

Shortly after the establishment of the course and diploma in ophthalmology at Oxford University, England, Jackson persuaded the University of Colorado to create a similar degree based upon a period of intensive teaching and supported by other educational provisions.

In 1899, after moving to Colorado the second time, Jackson, with William C. Bane and Melville Black, met to found the Denver Ophthalmological Society, later called the Colorado Ophthalmological Society. At that time Denver had a population of 100,000. Only four of the larger cities of the United States then "had anything like an ophthalmological society."

One of the most vigorous comments to be found from Jackson's pen appears in the short address entitled "The local ophthalmological society," which he delivered to the Colorado Ophthalmological Society on the Society's twentieth birthday (Ophthalmic Record, 1909, volume 18, page 241): "A few years ago I asked an ophthalmologist (he was not a resident of Denver), a graduate of one of the best eastern universities, a good student, of more than average intelligence and success in practice, why he did not belong to a certain society. He replied: 'Well, the fact is, except yourself and one or two others, there isn't anybody west of (a certain eastern metropolis) that I think can teach me much about ophthalmology.' I did not make any direct reply; his case seemed hopeless. It was useless to disturb his self-complacency by uttering the thought that occurred to me: 'Why, what sort of a fool are you, that you think you are incapable of learning from anybody but your superiors.' "

Some further comments by Jackson in the same paper are worth reproducing here: "Pretty much all that the greatest leaders of thought learn, they learn through contact with their inferiors. . . . The important thing is that we are all dif-

ferent. . . . The greatest teachers of ophthalmology have become great through contact, first, with fellow students and teachers, and still more from contact with those who come to learn of them. . . . We can . . . come together on the frank basis of learning all we can from anyone who will teach, either by what he knows, or by the mistakes he has made."

Always urging more education and fuller professional contact, in 1915 Jackson persuaded the Colorado organization to hold a summer meeting which was called "The Colorado Ophthalmological Congress." The proceedings of this Congress, as recorded by its secretary, were published annually in the quarterly Annals of Ophthalmology. The first such meeting was held on July 22 and 23, 1915.

After a few years the Colorado Otolaryngological Society joined in this summer meeting. The next educational step, again initiated by Edward Jackson, was for the two societies to organize a two-weeks "Summer Course" in ophthalmology and otolaryngology. The first such course was held in 1923. In addition to addresses by visiting ophthalmologists from other parts of the country, the program consisted of demonstration classes in various ophthalmic subjects, given to small groups into which the general attendance of forty to sixty postgraduate students from various states of the Union was divided.

This Summer Course, which was very popular, gradually served as a stimulus to the creation of similar enterprises in other parts of the United States. It was incidentally a source of great personal satisfaction to its founder, since it brought him into close contact with many ophthalmologists, especially among the younger generation, whom it was his particular delight to help along their professional way.

Dr. Isaac H. Jones of Los Angeles used the following words in announcing to Jackson the inauguration of the mid-winter Course in that city: "To you, Sir, our inspiration, we send this first message. Last night we pledged ourselves to give, as nearly as we can, a course similar to the course in Denver. This will be a continuous two-weeks course in ophthalmology and otolaryngology in Los Angeles, January, 1932."

The intensive course conducted in the English language at the University of Vienna for a number of years from 1923 was the outgrowth of a suggestion made by Jackson to Professor Ernst Fuchs during one of the latter's visits to the United States.

From his earliest professional days Jackson displayed striking ability in the use of elegant yet simple, direct, and logical English. He knew how to introduce a subject and how to bring his arguments to a forceful conclusion.

In the small quarterly publication entitled "Ophthalmic Literature" (containing classified lists of the world's periodical literature on ophthalmology), he devoted several editorials to the importance of writing good English. "To permit an idea to pass without formulating it in words," he said, "is to permit opportunity for thought to pass unutilized. Until rendered into words, no thought becomes definite or permanent. Until so fixed it cannot be weighed, compared, estimated, utilized. Exact, definite thinking cannot be done without the choosing of words to fit the thought."

Jackson's editorial activity was almost lifelong. He was drawn to this work partly by his ability for self-expression and partly by his desire to convey thought widely to others.

A certain consciousness of professional isolation in the young and somewhat sparsely settled Rocky Mountain region may have contributed to his decision to

found (in 1904) the Ophthalmic Year Book, the aim of which was to gather together in summary the world's thought and experience in ophthalmology. This was a courageous undertaking, naturally less complete in its infancy than in later years. Journals had to be obtained from all parts of the earth. The writers whom he enlisted for authorship of the various chapters were sometimes limited to a knowledge of English, and at best were seldom expert in more than one foreign language. Jackson himself knew a little French and less German. Much of the material was at first only accessible in abstracts provided by English-language or foreign journals of ophthalmology or general medicine.

The venture, printed and published in Denver, was at first supported financially by de Schweinitz and Schneideman, but later its maintenance, apart from the inadequate fund derived from annual subscriptions, fell entirely to Jackson. The number of ophthalmologists who were willing to spend even a moderate sum of money for an annual digest of the world's ophthalmic literature proved to be much too small to meet the financial outlay involved. So year after year Jackson made good the deficit. At the beginning of the World War, he suspended publication for one year. But a number of protests received from the more enthusiastic supporters of the Year Book led to continuance with a double volume in the following year.

When the amalgamation of American eye journals to form the American Journal of Ophthalmology took place, in 1918, trial was made of the method of publishing the Year Book in monthly, later quarterly, supplements to the Journal. This arrangement, never satisfactory, was dropped in 1923, in favor of a return to the original form of an annual volume. But subscriptions again proved inadequate to meet the cost of editing and publishing this volume.

In 1926, at the Dallas meeting, the present writer discussed the problem of the Year Book before the Section on Ophthalmology of the American Medical Association. A special committee was formed to investigate means of continuing and financing the Year Book. But by this time Jackson had apparently come to the conclusion that the number of ophthalmologists who sincerely desired such a publication as a part of their professional equipment was not sufficient to justify the further effort. After a circular letter addressed to the profession had produced a shamefully small number of replies, the Year Book was definitely dropped, to be replaced, as well as possible, by the comprehensive abstract department which was then started in the American Journal of Ophthalmology.

In Philadelphia, as previously mentioned, Jackson had had an editorial connection with the Philadelphia Polyclinic. In Colorado, he was for several years editor of "Colorado Medicine," the organ of the Colorado State Medical Society, in whose foundation he had played an important part.

The quarterly publication issued by Jackson under the name of "Ophthalmic Literature" contained, beside brief editorials, only names of authors, titles, and references of the periodical literature of ophthalmology of the world so far as these were available. It was published for seven years, and was discontinued when the Year Book came to be published again as a separate volume, after its temporary inclusion in the American Journal of Ophthalmology.

In 1917, under the pressure of World War necessity, a number of periodical British eye publications were combined to form a single national eye journal, "The British Journal of Ophthalmology." Jack-

son was much impressed with the desirability of such a unified national monthly, and proceeded to move for a similar development in the United States. The result was the formation of the Ophthalmic Publishing Company, representing the ownership of a number of earlier publications, and which, beginning with January, 1918, issued the American Journal of Ophthalmology, third series. This was at first announced as replacing "The Ophthalmic Record, Annals of Ophthalmology, Anales de Oftalmologia, Ophthalmology, and the Ophthalmic Year Book and Literature."

An attempt to have Herman Knapp's Archives of Ophthalmology included in this amalgamation proved unsuccessful, because the name of the new combined journal was inconsistent with Dr. Arnold Knapp's feeling that he must perpetuate the name of the journal which his father had founded, and which has more recently been taken over by the American Medical Association with retention of that title.

Editorship of the new American Journal of Ophthalmology had at first been assigned to Casey A. Wood, proprietor and editor of the Ophthalmic Record. But Wood was called to Army service, and Jackson found it necessary to shoulder the task.

Jackson's miscellaneous publications include the following volumes: Essentials of diseases of the eye, nose and throat, published in 1890; Skiascopy and its practical application, published in 1895; and A manual of the diagnosis and treatment of diseases of the eye, published in 1907.

His "Skiascopy" is particularly noteworthy for its scientific analysis of the subject.

He contributed the section on "Operations on the extrinsic or orbital muscles" in Casey Wood's "System of Ophthalmic Operations." He also wrote for Wood's "Encyclopedia of Ophthalmology" the article on skiascopy and that part of the article on ocular muscles which deals with operations.

A bibliography of his writings, including editorials, appears in the Jackson Birthday Volume, "Contributions to Ophthalmic Science," 1926. His various writings since that time are listed in the annual indexes of the American Journal of Ophthalmology, including those which appear under the item "Editorials."

Dr. Jackson's most important single contribution to the daily practice of the average ophthalmologist, outside of his description of skiascopy, is to be found in his practical application of the principles of cross cylinders to the measurement of astigmatic errors. His first written recommendation of the cross-cylinder test for the amount of astigmatic error appeared in 1893; and the even more valuable cross-cylinder test for astigmatic axis was announced in 1907.

The general principles of crossed cylinders had been described by George Gabriel Stokes, Irish mathematician and physicist, in 1849; and in 1860, William S. Dennett, inventor of the electric ophthalmoscope and proponent of the centrad as a unit for expressing the deviating power of ophthalmic prisms, had designed a rather complicated and unmanageable cross-cylinder combination, for testing the amount of astigmatism.

As to the test for amount of astigmatism, Jackson simplified the apparatus. The test for axis, so far as is known to the present writer, was entirely original with Jackson.

. . .

Edward Jackson remained surprisingly active and vigorous beyond those exceptional four-score years whose strength, according to the Psalmist, is mere labor and sorrow. Out of five children who came to adult life, two had died about

the year 1913 and another in 1928. His second wife preceded him by twenty years. Yet his faith in mankind, in creation, and in the future seemed undiminished. His hearing and vision continued perfect, his voice retained its full resonance, and his step, almost to the last, was quick and elastic.

He had a great belief in his own physical soundness, which he attributed in large part to correct living. He walked a great deal, ate very simply and sparingly, had not indulged in tobacco since his early manhood, and touched alcohol only rarely and then as a courtesy to others. Not long before his death he was still (although by easy stages) cutting his own lawn and tilling his own small garden. In such things he was extremely deliberate and systematic. He would shovel away a little snow in the morning and more in the evening, and he took delight in telling how he piled the snow around his shrubbery to keep the roots protected during the winter. Every year he grew rows of sweet corn for his own table.

Jackson carrying a watermelon, near Berthoud Pass, Colorado, probably about 1932.

He had been shocked by an apparent threat of physical breakdown at the age of sixty-five years. At that time he was greatly preoccupied with editorial work on the American Journal of Ophthalmology and in other ways. He would wake in the small hours of the morning and, seeming unable to use the time in sleep, would rise and work on literary tasks. His own account of systematic convalescence from the infirmity which then threatened was given fifteen years later to a professional friend who was contemplating retirement on account of ill health.

"My lesson," he says, "came when I was sixty-five. It seemed the end . . . for several weeks I saw no patients, and went into the mountains and walked (my heart was never weak). Gradually strength came back. I used it to gain more. Then I tried how much time I could give to seeing patients, and at the end of a year realized I could still work some and keep my health. . . . To remain active keeps up one's morale."

His tendency to exact analysis of everything that happened to himself and to the world around him was supported by a great fund of general knowledge. He read deliberately and had a remarkably good memory. He was independent in politics, had a great deal of sympathy for the "under dog," and for a number of years was an enthusiastic supporter

of the Single-Tax movement.

He had little training in music, yet for years hardly ever failed to attend a concert by a visiting artist or a performance by the local symphony organization.

But his chief enjoyment in later years came from numerous long journeys across the country to attend medical meetings, and incidentally to visit members of several generations of his family. (He had nine grandchildren and eleven great grandchildren.) In spite of his enthusiasm for medical science as presented at the various gatherings, his particular pleasure was to renew acquaintance with friends old and young. He appeared on many national and local programs, and was accorded many tokens of admiration and affection.

Of the two portraits of him painted by professional artists, much the more nearly accurate is the one by McClymock which hangs in the library of the Denver County Medical Society. Of the portrait in Wills Eye Hospital he was heard to remark: "I didn't think I looked like that."

He sought out and accepted the good wherever he recognized it. He had very little disposition to argue questions of priority. It was sufficient for him that work was good and useful, without bothering who first presented it to the medical public. Exceedingly generous in his estimate of others, his replies even to those with whom he essentially differed were apt to be encouraging and stimulating rather than critical. His book reviews displayed the same characteristic. Yet he was entirely tolerant of sound criticism as uttered by other contributors to the Journal.

His only visit to Europe was made in 1911. It was of a recreational character and included only Great Britain and Ireland. Medical leaders in Europe knew him chiefly through his writings, through correspondence, or through having met him in the United States.

It would be foolish to suppose that the natural ego was not gratified by the words of praise which were heaped upon him from all sides in his later years. But his attitude was always modest, never arrogant, always liberal in praise of the work of others. Among the many tokens of appreciation and friendliness which he received, none perhaps touched him more deeply than the sending to him in Saint Louis, when he was kept in the hotel room by a digestive upset, of a bouquet made up of a single flower from each table at the annual banquet which he was to have attended as guest of honor.

His interests and his writings touched the whole field of ophthalmology. So universal was his fraternal and professional spirit, that in his passing every ophthalmologist has lost a friend and a preceptor.

His philosophy was epitomized at the end of his written application for renewal of membership in the Birmingham Friends Meeting: "Peace with all men. Ideals of brotherhood. Plain living. Freedom from mere tradition or formal observance. The duty of each to do the most he can for the good of all."

530 Metropolitan Building.

EDITOR'S NOTE: A limited number of the two portraits of Dr. Edward Jackson, published in this article, are available to our readers upon application to the editor, 640 South Kingshighway, Saint Louis, Missouri.

GRANULOMA INGUINALE OF THE EYELID*

Report of a case

Alfred L. Weiner, M.D., Irwin E. Gaynon, M.D., and Morris S. Osherwitz, M.D.
Cincinnati, Ohio

In 1896 Conyers and Daniels first recorded as a clinical entity a characteristic ulceration of the genitals occurring among the Negroes of British Guiana and among the East Indians. They named this condition, which had previously (1882) been recognized by MacLeod, granuloma inguinale.[1] In 1905 Donovan demonstrated in these lesions the peculiar organisms now bearing his name, and advanced the idea that they were the specific cause of the disease.[2] Since this time granuloma inguinale has been found in many other parts of the world (it is endemic in the southern United States and in certain of the northern states) and the Donovan body has been accepted almost universally as the causative agent even though its exact nature is still obscure.

Granuloma inguinale is a chronic locally destructive disease seen chiefly in adult Negroes and characterized by progressive, indolent, granulomatous ulcerations affecting the crura, genitals, pubes, and para-anal area. The disease affects both sexes and is apparently transmitted principally through sexual intercourse, thus earning a place among the venereal diseases (fourth venereal disease). The regional lymph nodes are rarely clinically involved, although Donovan bodies have been found in these structures in granuloma inguinale induced experimentally in human volunteers through inoculation with material rich in Donovan bodies. "Pseudobuboes" is a term applied to the subcutaneous inflammatory granulomas which give rise to tumefaction in the regions of the lymph nodes and which not infrequently are present in granuloma-inguinale patients.[3] Absence of true adenopathy is of paramount importance in the differential diagnosis of granuloma inguinale and lymphogranuloma inguinale (venereal lymphogranuloma, fifth venereal disease). The latter condition is an entirely separate venereal disease caused by a virus and characterized by prominent enlargement of the (inguinal) lymph nodes.

Extragenital lesions in granuloma inguinale are relatively uncommon but by no means rare. Their occurrence has been placed at about 6 percent from the case reports and surveys in the literature.[4,5] In most instances the diagnosis has been entirely clinical, but Donovan bodies have been demonstrated in a few cases. It is presumed that extragenital infections result from antoinoculation. Lesions have been observed affecting the cheek, neck, nose, throat, larynx, pharynx, hand, shoulder, lips, and mouth.[5] The case described herein is the first instance of involvement of the eyelid to be recorded.

Case report

J. S., a colored male laborer, aged 32 years, was admitted to the urologic service of the Cincinnati General Hospital on January 8, 1942, complaining of abdominal pain, fever, chills, anuria, and swelling and pain of the genitals. He stated that he had had frequency of urination, dysuria, and dribbling of urine for the

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two years preceding admission. There was a history of an ulcerative penile lesion, in 1939, which had persisted and progressed for about 18 months and had then healed with scarring and distortion of the penis. The patient also gave a history of chronic urethral discharge of more than 10 years' duration. There was no history to suggest syphilis, serologic testing, or antisyphilitic therapy. The past history was otherwise insignificant and the general health had always been good.

Examination disclosed that the patient was acutely ill and dehydrated. The temperature was 102°F., the pulse 100, and the respirations were 24. The bladder was found to be distended and there was edema, redness, and tenderness of the scarred penis and of the scrotum, superpubic area, and abdominal wall. The blood pressure was 150/80. The results of remainder of the physical examination and the neurologic examination were negative.

The patient's immediate condition was interpreted as urethral stricture with urinary retention and extravasation. He was given intravenous fluids and supportive therapy and removed to surgery, where suprapubic cystotomy and multiple incision and drainage about the abdominal wall, suprapubic area, scrotum, and perineum were performed. A suprapubic catheter was inserted and frequent saline irrigations instilled. The patient made an uneventful recovery from the distress of urinary retention and the wounds from incision and drainage gradually healed. On January 31st dilatation of the urethral strictures was performed under spinal anesthesia.

Laboratory data obtained during the course of the patient's hospitalization were as follows: The urine was clear, with a specific gravity of 1.016 and a pH of 6, and contained a moderate number of red and white blood cells; the reaction for sugar was negative, but there were traces of albumin; the Kahn reaction of the blood was positive; there was mild leukocytosis with a normal distribution of the polymorphonuclear leukocytes; the red-blood-cell count and the hemoglobin determinations were normal; chemical estimation of the blood levels for urea nitrogen and carbon-dioxid combining power were within normal limits; cultures of the pus evacuated from the incised areas were positive for aerobic and anaerobic nonhemolytic streptococci.

Ophthalmologic consultation was requested on February 2, 1942, for treatment of recurrent styes. The vision at this time was 20/25 in both eyes. On external examination the right lid was normal in appearance. The left upper lid presented what appeared to be an acute hordeolum the size of a large pea and beginning to point at the base of the cilia. Pressure against the lacrimal-sac areas failed to elicit regurgitation. The bulbar and palpebral conjunctivas were normal. The pupils were round and equal and reacted to light and to accommodation. No pathologic changes were found in the cornea when examined by direct and oblique illumination with the slitlamp and the corneal microscope. The ocular motility was normal.

On ophthalmoscopic examination, the media of both eyes were clear, the discs were round, not elevated, and of normal color. The vessels were normal in caliber, color, and the ratio of arterioles to veins. The peripheral vessels and maculas were normal. The peripheral fields (confrontation test) and tactile tension were normal.

Incision for drainage of the hordeolum was done and 5-percent sodium sulfathiazole ointment with hot compresses was ordered. Culture of the pus taken at this time was positive for Staphylococcus aureus. The patient was not seen for two weeks. Examination at this time disclosed an extensive necrotizing ulceration of the

Fig. 1 (Weiner *et al.*). Granuloma inguinale ulcer of the eyelid in February, 1942.

middle half of the left upper lid with a large crescentic area, including a large portion of the tarsus, sloughed away. The margins of the ulcer were irregular and the surface covered by a profuse dirty-gray discharge. Very little pain or tenderness was present (fig. 1).

A section of tissue was taken for histologic examination.* The report was as follows: "The specimen for microscopic examination consists of a fragment of stratified squamous epithelium and a

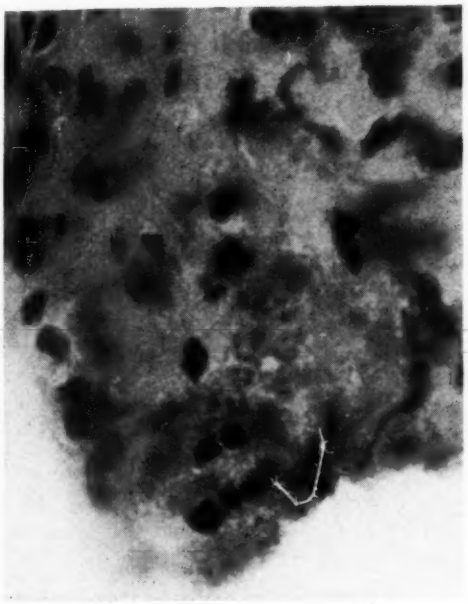

Fig. 2 (Weiner *et al.*). Histologic section of tissue from eyelid, showing Donovan bodies contained within large monocytic cells. Hematoxylin and eosin preparation, ×1,410.

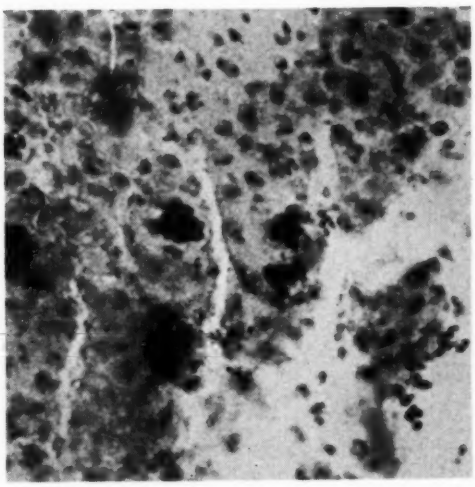

Fig. 3 (Weiner *et al.*) Donovan bodies in histologic section, Giemsa stain.

*The authors are indebted to Dr. Mary Knight Asbury and the Ophthalmologic Laboratory of the Holmes Hospital for the preparation of the histopathologic sections.

Dr. E. R. Pund of the Department of Pathology of the University of Georgia examined the histopathologic sections and confirmed the presence of Donovan bodies therein. Dr. Robert B. Greenblatt of the University of Georgia also gave valuable suggestions and assistance in the preparation of this report.

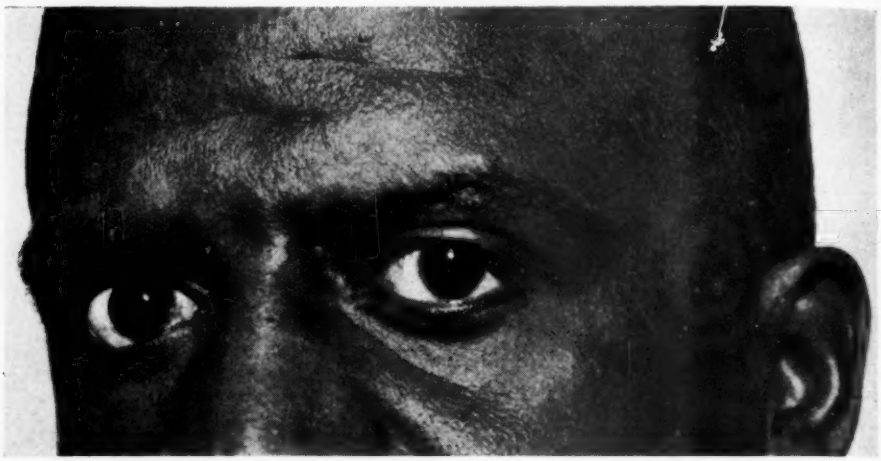

Fig. 4 (Weiner *et al.*). Appearance of eyelid following therapy with tartar emetic, April, 1942.

small portion of subcutaneous tissue. The epithelium appears intact. In the rather cellular subcutaneous tissue a fine chronic and acute inflammatory reaction is taking place, as is evidenced by large numbers of acute inflammatory cells diffusely dis-

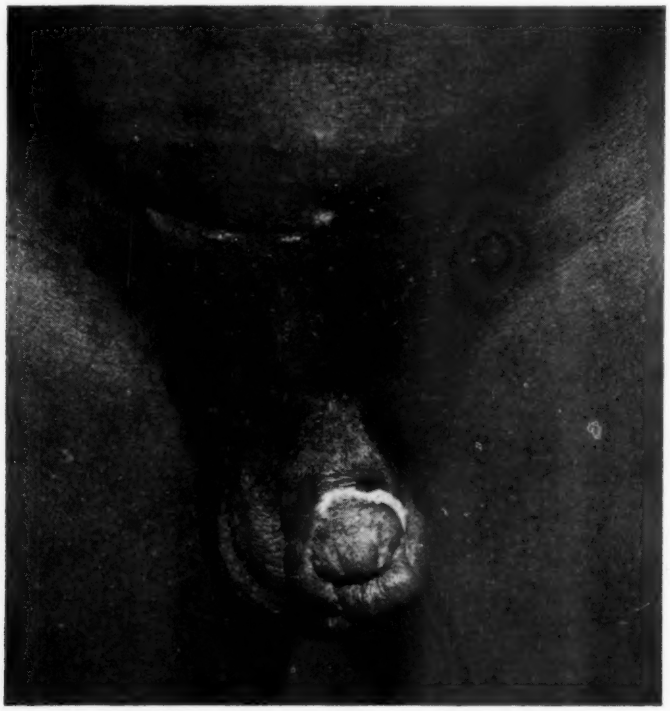

Fig. 5 (Weiner *et al.*). Characteristic scarring and distortion of genitals in granuloma inguinale. The multiple scars of the pubis and abdominal wall are the result of incision and drainage necessitated by urinary extravasation secondary to old gonorrheal urethral strictures.

tributed through a stroma that has undergone some fibrosis and contains an appreciable number of lymphocytes, plasma cells, and large monocytes. Diagnosis: Acute and chronic inflammation of the eyelid."

The lesion was treated with applications of 2-percent silver nitrate and the patient was advised to continue the 5-percent sodium sulfathiazole ointment and hot compresses, but there was no appreciable response to this therapy.

The patient was then referred to Bethel Night Clinic for antisyphilitic treatment and to the Ophthalmologic Clinic for follow-up observation. Lumbar puncture and examination of the spinal fluid were performed. The cell count and protein content were normal and the Wassermann and colloidal-gold-curve tests were negative. Frei tests for lymphogranuloma inguinale gave negative results.

In view of the presence of characteristic healed granuloma inguinale of the penis, the destructive lesion of the eyelid was given reconsideration as an extension of this process. The original histologic sections were reëxamined and the characteristic[6] large monocytes containing Donovan bodies were demonstrated. It was apparent that most of the inflammatory cells were polymorphonuclear leukocytes (figs. 2 and 3). Antisyphilitic therapy was withheld, and injections of 1-percent tartar-emetic solution were given biweekly (10 c.c.). There was a prompt favorable effect, and within six weeks complete healing of the eyelid was effected (fig. 4). This form of treatment has been continued for several months beyond this point to offset the well known tendency to relapse of granuloma inguinale.

Comment

The clinical aspects of this patient's ulcer of the eyelid were characteristic of granuloma inguinale as one sees this process elsewhere. The lesion began as a hard edematous area and then progressed to ulceration and destruction of tissue. The histopathologic sections showed the polymorphonuclear leukocytic exudate of acute granuloma inguinale and the pathognomonic large monocytic cells containing Donovan bodies. The prompt response to tartar-emetic therapy was also characteristic.

This patient presented an especially interesting problem in diagnosis because of the presence of a positive Kahn reaction of the blood. Had antisyphilitic treatment been given the true diagnosis would certainly have been obscured if not entirely lost, inasmuch as the arsphenamines are known to exert a beneficial therapeutic action upon the lesions of granuloma inguinale. Tartar emetic, on the other hand, is of no value in the treatment of syphilitic lesions. It seemed significant that an extragenital lesion appeared following incision and drainage of sites adjacent to a previously infected and apparently quiescent area of granuloma inguinale. The subtle tendency to relapse, so characteristic of granuloma inguinale, apparently was initiated by surgical trauma, and this in turn was followed by autoinoculation of the eyelid.

Summary and Conclusions

1. A patient with an extragenital lesion of granuloma inguinale affecting the eyelid is described in detail.

2. The diagnosis was established by the demonstration of Donovan bodies in the tissue of the eyelid, by the presence of clinical granuloma inguinale of the genitals, and by the response to specific therapy.

3. The diagnostic hazards created by the presence of positive serologic tests for syphilis are reëmphasized.

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PRACTICAL IMPORTANCE OF ANISEIKONIA*

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The retinal images of the same object are not exactly alike in the two eyes. The cerebral coördinations of these unlike images give us the advantages of binocular vision. [EDITOR'S COMMENT: In some individuals another kind of dissimilarity has been described, in that the two images of any object observed by the affected person are not merely unequal in character but unequal in size.] Professor Ames, of Dartmouth college, had called attention to such differences 10 years ago. From two Greek words were obtained a name for this condition *aniseikonia*, meaning unequal images.

The existence and importance of such inequalities had been observed more than 100 years before. Professor George B. Airy, of Cambridge University, England, had described the difficulties with his own eyes in 1827; and published them in the Philosophical Transactions. He had known of Thomas Young's observations on astigmatism and had applied to his own eyes Young's method of testing his refraction.

In the evolution of binocular vision the eyes were moved from the sides of the head to the front; where both can see the same objects. The coördination of the two ocular images into one impression is not effected by an inherited mechanism of the nervous system. It is acquired most rapidly during infancy, but goes on for different objects looked at during the greater part of life. The two impressions of one object, seen from the slightly different positions of the two eyes, can never be exactly the same. But they need to be sufficiently alike to be readily combined for the normal binocular conception of the things we see. When they are so unlike that they do not fit together in a normal coördination the problem of aniseikonia arises.

The problems of aniseikonia are generally solved by the use of the eyes during infancy. The young child is continually looking from one thing to another, and all the time he is recording and coordinating his visual experiences. Too great differences between the images received in the two eyes cause great difficulty in associating them, and this interferes with perfecting coördinations, and the using of the two eyes together.

* Read at the seventy-eighth annual meeting of the American Ophthalmological Society at Hot Springs, Virginia, on June 1, 1942.

† Died, October 29, 1942.

Such differences may thus become a cause of strabismus, which would be removed by the wearing of correcting glasses. Relief from aniseikonia may be more important than the relief of strain of accommodation with convergence.

George B. Airy, when Professor of Astronomy in the University of Cambridge, noticed that one of his eyes saw a star as others with good sight saw it. But to his other eye the star appeared as an oval blur of feeble light, with its long axis 35 degrees from the vertical. Like Thomas Young, Airy studied his refraction by looking at a point of light. He found it appeared as a line, most distinct in one direction when 6 inches from his eye, and, in the meridian at right angles to that, at 11 inches from his eye. He had a compound myopic astigmatism. As we would state it, he required: −6.50D. sph. ⌯ −4.50D. cyl. Assuming that the myopia depended on increased length of his eyeball, any one may produce the vision Airy had with his defective eye by placing before his own eye a +6.50 D. sph. ⌯ +4.50D. cyl. ax. 125°.

Airy obtained a sphero-cylindrical correcting lens from an optician, and with such a lens the image of the star appeared to that eye as it did to the other. He reported his case as one of astigmatism, that being the name that his colleague, Professor Whewell, suggested for the defect noticed by Thomas Young. Any one who produces the optical defect by the use of convex lenses will notice the inequality, in size and shape of the two images. Clearly Airy suffered from unequal images caused by his high myopic astigmatism. Evidence seems to show that he was entirely relieved by his correcting glass. In 1835 he was made Astronomer Royal, a position he held for 46 years. His contributions to the theory of light and the interference of light were advances in scientific theory accepted by astronomers and mathematicians everywhere.

Helmholtz and Donders cite Airy's as the first known case of "abnormal astigmatism." They commend his correction of it by a sphero-cylindrical lens, in a time when opticians worked with cross convex cylinders, because they were supposed to give a better field than spherical lenses. We may therefore accept his case as one of high aniseikonia, in which the correction of his myopic astigmatism proved an efficient remedy.

The most common cause of extreme aniseikonia today is removal of cataract from one eye while the fellow eye retains good vision. Two cases of this kind are reported. In both satisfactory binocular vision was afterwards secured and maintained. This may be accepted as the general result in cases of aniseikonia, if glasses correcting the errors of refraction are constantly worn.

Case 1. G. S. S. had been treated in early life for uveitis in his right eye. At the age of 41 years he was seen with cataract of that eye, reducing vision to light perception. At the age of 42 years the cataract was removed, and with a correcting glass vision was found to be 24/20. He was given a partial correction for his aphakic eye, and the convex spherical gradually increased until he was wearing:

R.E. +11D. sph. ⌯ −1.37D. cyl. ax. 68°
L.E. − 4D. sph. ⌯ −1.12D. cyl. ax. 80°

These gave vision in each eye of 24/20. Ten years later he was asked if there had been any trouble with using the two eyes together. He said not. Sometimes when driving his automobile in the country, if he looked off through the upper part of his glasses, he saw "something like a mirage." But it never gave him any trouble. Evidently the strong prismatic effect of the edge of his cataract glass be-

came noticeable in this kind of double vision.

Case 2. B. T., aged 63 years, had a cataract extracted from his left eye by Dr. John H. Burleson, of San Antonio, Texas. He was an automobile salesman, whose territory included Colorado. He came, on May 24th, seeking a correcting lens for his aphakic eye. He was told it would be unsafe to put that eye to use so soon after the cataract operation. On October 8th, he returned, again asking for a correcting lens for the left eye, because when tested, it showed better vision than the right. He was given:

Right +2.25D. sph. ⊂⊃ −0.50D. cyl. ax. 84°; V. = 1.2

Left +11D. sph. ⊂⊃ −2.50D. cyl. ax. 125°; V. = 1.3

+2.50 spherical was added to each lens for near.

The day after he got these glasses he drove his automobile over 100 miles, and reported next day that he had had no trouble at all with his new glasses:

The correcting lens for an aphakic eye necessarily enlarges the retinal image, and generally the principal meridians of refraction do not correspond to those of the other eye. But no insurmountable difficulty from aniseikonia has been encountered after such correction.

The most common effect of aniseikonia is the disturbance that arises from the wearing of glasses that correct ametropia, when the ametropia is of different amounts or has differing principal meridians of astigmatism in the two eyes. This is noticed by many patients, and may be a source of dissatisfaction with the new glasses. In all such cases it is wise, when giving the prescription for the glasses, to explain to the patient, that certain disturbances in the appearance of objects may be expected, but that this will soon disappear with the constant wearing of the glasses. Generally it disappears within a few weeks, and often within a few days. If the glasses are not worn constantly the disturbance is renewed every time they are omitted. Occasionally a similar annoyance is caused by a change in the amount or meridians of astigmatism. This may occur so long as the crystalline lens continues to grow and remain clear.

The total refraction of the eye depends upon the refraction of the cornea and the refraction of the crystalline lens. The refraction of the cornea is sometimes changed by accidental injury, and subsequent healing of the cornea; but apart from this it usually remains the same after early adult life. The crystalline lens in the human eye normally continues to grow so long as clear cortex is formed under the lens capsule. This may continue in old age. The growth of clear cortex very generally changes the shape of the lens, and so changes the total astigmatism of the eye, and may continue to change the total refraction. Changes of refraction by growth of the lens often cause aniseikonia. But the change is so gradual that the coördination of vision may be changed without any consciousness of disturbance. It is the consciousness of sudden change, as by a change of lenses before the eye, that makes aniseikonia of practical importance. When time is given to establish new coördinations of vision, change in the size of images gives no trouble. Such changes of coördination, effected in the central nervous system, are possible at all ages.

Republic Building.

OCULAR FINDINGS IN CHILDHOOD ENDOCRINOPATHIES*

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Chicago

This study represents the ocular findings in a group of children with various entities of apparent and real endocrinologic origin. The literature gives but little information pertaining to ocular findings in childhood endocrinopathies.

Ellis and Tallerman,[1] in their survey of 50 obese children, found no instance of gross abnormalities of the visual fields, no evidence of papilledema or tumor of the pituitary or suprapituitary region. Bothman,[2] in a series of 68 cases with progressive axial myopia, found a low basal metabolic rate; in half of the cases this being less than 15 percent. Ruedemann,[3] in his group of children who had progressive myopia, found a low basal metabolic rate and a very low glucose-tolerance curve. He believes that there is some constant factor in the production of the high degree of myopia, hyperopia, and of the corneal disturbance. In his opinion these cases belong to the hypopolyglandular group. E. Fuchs,[4] in 1922, stated that the eyes in myxedema and cretinism are only very rarely affected, and that no direct influence of the secretion of the gonads on the eye could be found experimentally or clinically. Souter,[5] in the 1930 Transactions of the Ophthalmological Society of the United Kingdom, stated that it does not seem far fetched to assume the presence of some selective affinity in parts of the visual pathway for toxins or altered secretions elaborated in the pituitary, and that in this way visual disturbances may arise apart altogether from the usual accepted pressure and traction conditions. William Zentmayer[6] is of a similar opinion. Meyer Wiener[7] believes that lack of development of the gonads is probably the cause of keratoconus. Rowland[8] found form- and color-field changes in 23 out of 98 cases of pituitary dysfunction. Apparently all of these were among adults. Other authors who contributed to this subject include Cockayne,[9] who in 1936 cited two dwarfs with waxy atrophy of the discs and attenuation of the retinal arteries, and Selinger,[10] who, quoting Duke-Elder, stated that cretinism is almost invariably accompanied by myopia.

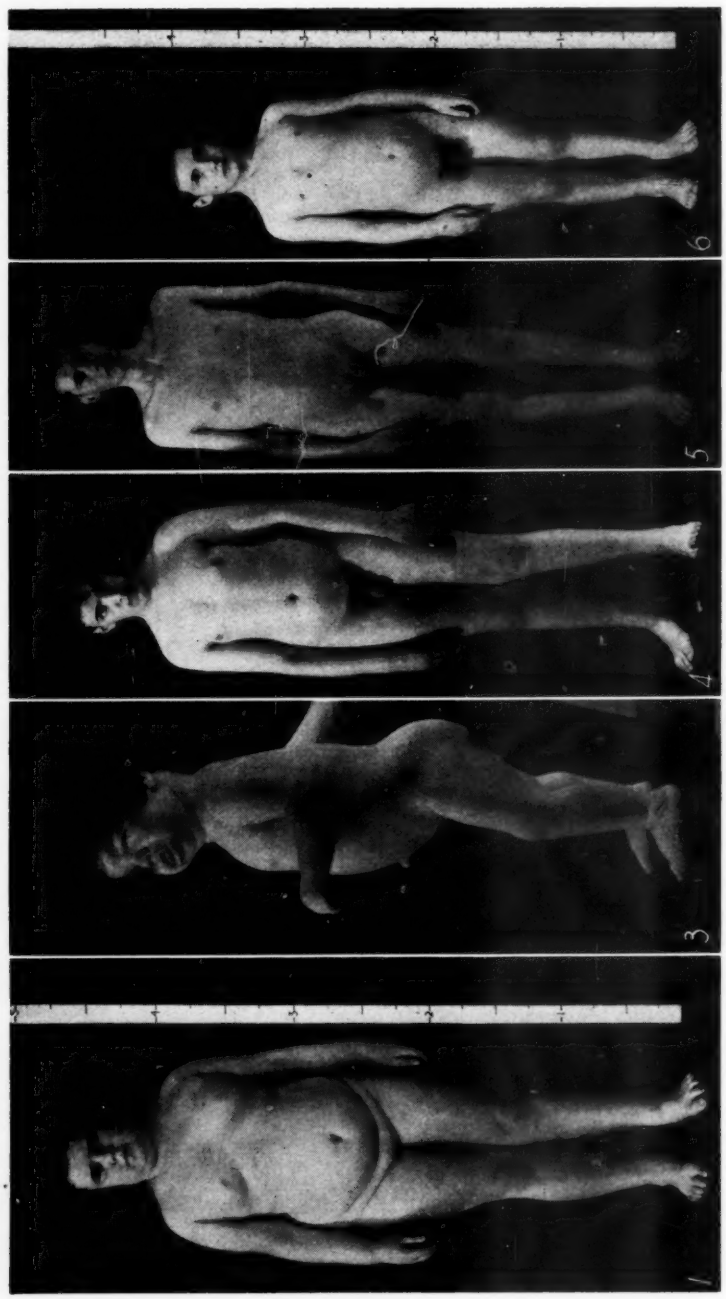
A great deal has been written on thyroid and pituitary dysfunction and tumors in adults, but little information and still less statistical data on ocular conditions in the endocrinopathies of children are available. Our series includes 63 obese children, referred as having "Fröhlich's syndrome"; 17 patients of less-than-normal stature presumably of pituitary origin; 8 thyroid-deficient boys and girls; and 10 heterogeneous cases, including 3 of hypogonadism, 2 of gigantism, 3 of sexual precocity, and 2 of pseudohermaphrodism.

Before proceeding to the analysis of results we shall give a kaleidoscopic picture of the various groups studied.

THE GROUP OF OBESE CHILDREN (FIG. 1)

Several hundred obese children have been referred to us as having Fröhlich's syndrome or dystrophia adiposogenitalis. These patients were presumed to have pituitary disease or a combination of pituitary and thyroid involvement. Since adiposity in childhood is the most common so-called endocrinopathy encoun-

* From the Departments of Ophthalmology and Pediatrics (Endocrine Clinic) and the Research and Educational Hospital, University of Illinois, College of Medicine. Read before the Chicago Ophthalmological Society, May 11, 1942.



Figs. 1, 3, 4, 5, and 6 (Apple and Bronstein). Childhood endocrinopathies. Fig. 1. Obesity, age 9 years, 5 months. Fig. 3. Hypothyroid, age 6 years. Fig. 4. Gigantism, age 13 years. Fig. 5. Hypogonadism, age 24 years. Fig. 6. Pseudohermaphrodism, age 5 years.

tered in pediatric practice—at least numerically—this makes the "fat group" the most important one, and the largest number of children studied were from this category. The prevalent assumption that obesity is usually an expression of some underlying endocrine dysfunction has led to the indiscriminate administration of various endocrine products.

For a number of years we have been investigating the problem of the "Fröhlich child." We have attempted to find evidence, clinical, laboratory, or both, that might substantiate an underlying endocrine cause for the obesity, and at the same time to study the effect of diet, various glandular products, and special drugs on this condition.

From our studies[11] of adipose children we have come to the conclusion that neither pituitary nor thyroid disease need be postulated. We do not deny, however, the possibility of a temporary aberration in the endocrine system or in the hypothalamus.

From our studies over a long period of observation, it has become evident that obesity tends to correct itself at or about puberty, at which time mentally adequate children become cognizant of their obesity as a handicap and are willing to cooperate satisfactorily in a dietary regime.[12]

Recent excellent work as well as ours has emphasized the fallacy in designating markedly overweight children as having Fröhlich's syndrome (which is quite a rarity), and the suggestion has been made that this term be deleted from the literature.

The undersized group (fig. 2) presumably of pituitary origin

Marie and Paltauf were among the early observers who attributed to the pituitary gland an important role in growth, and numerous studies since their time have shown the relation of the underactivity of this gland to retarded growth, and the overactivity of the anterior pituitary to accelerated growth. Interest in dwarfism, particularly in the idea of rehabilitating the classic dwarf, was stimulated by isolation of the growth hormone by Evans in 1921.

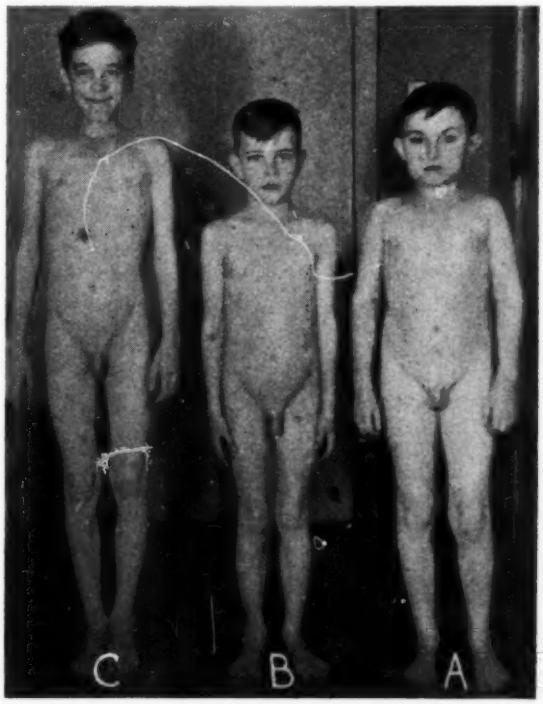


Fig. 2 (Apple and Bronstein). A, dwarf, 17 years; B and C, normal stature at 9 and 13 years, respectively.

While statural underdevelopment is not particularly difficult to recognize, nevertheless, in the diagnosis of pituitary dwarfism[13] other causes for arrested development must be excluded, such as, thyroid deficiency, dwarfism associated with congenital bony and cartilaginous anomalies, and the group of chronic, recurrent, or severe illnesses of an infec-

tious, metabolic, or parasitic nature. Though one may be reasonably sure of the diagnosis, doubt always remains except in infrequent instances, one of which we have encountered.[14]

Hypothyroid group (fig. 3)

Of the thyroid-deficient children, only a small number are reported, but a number of these have been studied over considerably long periods of time. The recognition of the untreated hypothyroid child who exhibits lack of statural growth with retardation of dentition, sitting, walking, and talking, slow mental development, and a subnormal body temperature is not a difficult diagnostic problem. However, the recognition of the borderline as well as of the inadequately treated hypothyroid child[15] may be attended with difficulties, and the following adjuncts[16] are employed to aid in the diagnosis: basal metabolic rate, blood cholesterol, urinary creatine excretion, osseous development, epiphyseal closure and dysgenesis, and blood iodine. We wish to stress that all of these tests have their definite limitations; with regard to basal metabolism we emphasize that hypometabolism is not necessarily synonymous with hypothyroidism.

We further point out that early diagnosis and active and persistent treatment thereafter is most important in influencing the prognosis. As to physical growth, provisional data on 19 children whose condition was recognized when they were between the ages of one and seven years and who were treated actively thereafter, indicates good progress, arbitrarily accepting good as meaning above the median normal. For adequate mental development, recognition must be around the first year if not earlier.[17]

The mixed or miscellaneous group (figs. 4, 5, 6)

In this group we have examples of gigantism, gonodal failure resulting in hypogonadism with gynecomastia,[18] three patients with hypergenitalism and two with pseudohermaphrodism. In the cases of statural overgrowth in which we presumed anterior-pituitary eosinophilic overfunctioning we were not able to demonstrate hypophyseal pathology. Hypergenitalism[19] constitutes a very remarkable clinical picture in which the search for the underlying mechanism is indeed a very alluring one. Pineal hypergenitalism has recently been questioned, and the part the hypothalamic apparatus plays in the production of precocious sexual development is worthy of considerable thought.

Pseudohermaphrodism is a syndrome applied to cases of virilism with an anomaly of the external genitalia (present at birth)—that is, an enlarged clitoris, a urethral opening just beneath the phallic structure, as in hypospadius, and a vagina that usually opens into the urethra with no external orifice. These patients are usually of small stature. It is averred[20] that this congenital abnormality in a patient whose gonads are ovaries, is associated with either a suprarenal cortical hyperplasia or tumor. This was confirmed in two of our patients.[21]

Analysis and Results

In the obesity group (tables 1 and 2) there were 37 males and 26 females. In 18 cases the vision was normal in both eyes; 7 patients had normal vision in one eye; 18 had subnormal vision in both eyes. In 20 no visual record could be obtained because of their age or poor cooperation. In the subnormal-vision group, six had less than 0.5 vision in both eyes, and four had less than 0.5 vision in one eye. Thus 42 percent of the patients whose vision could be tested had normal vision in both eyes and an additional 16 percent had normal vision in one eye; altogether 22 percent had less than 0.5 in both or

one eye. Thirty-five of these patients were refracted. One-half- to 1-percent atropine, 2-percent homatropine-hydrobromide, or a combination of 2-percent homatropine-paredrine was used for cycloplegia. Of these, 32 eyes had more than 2 diopters of refractive error; the highest correction

TABLE 1

OBESITY GROUP (FRÖLICH'S)—63 CASES

	Cases	Eyes	Percent
Normal vision in both eyes	18		42
Normal vision in one eye	7		16
Subnormal vision in both eyes	18		42
No visual acuity obtainable	20		
Less than 0.5 in both eyes	6		13
Less than 0.5 in one eye	4		9
Refracted	35		
More than 2 diopters error	18		51
More than 2 diopters error		32	45
Highest −2.25D. sph. ⊂⊃ +5.50D. cyl. ax. 95°			
Hyperopic eyes (simple or compound)		55	78
Range (+0.25D. cyl. to +3.50D. sph. ⊂⊃ +2.50 D. cyl.)			
Myopic eyes (simple or compound)		8	11
Range (−0.25D. sph. ⊂⊃ −0.50D. cyl. to −0.25 D. sph. ⊂⊃ −3.50D. cyl.)			
Mixed astigmatism		7	10

was −2.25D. sph. ⊂⊃ +5.50D. cyl. ax. 95°. Fifty-five (78 percent) were hyperopic, varying from +0.25D. cyl. to +3.50D. sph. ⊂⊃ +2.50D. cyl. Eight eyes (11 percent) were myopic, simple or compound, and these ranged from −0.25D. sph. ⊂⊃ −0.50D. cyl. to −0.25D. sph. ⊂⊃ −3.50D. cyl. Seven eyes had a mixed astigmatism.

TABLE 3

SHORT STATURE (PITUITARY) GROUP—17 CASES

	Cases	Eyes	Percent
Normal vision in both eyes	12		70
Normal vision in one eye	1		6
Subnormal vision in both eyes	4		23
Less than 0.5 vision in both eyes	0		
Less than 0.5 vision in 1 eye	2		11
Refracted	12		70
More than 2 diopters of refractive error—simple or compound		16	66
Highest +5.00D. sph. at 0.50D. cyl.			
Hyperopic eyes—simple or compound		19	79
Range +0.25D. cyl. ax. 90° to +5.00D. sph. ⊂⊃ +0.50D. cyl.			
Myopic eyes (simple or compound)		3	12
−0.25D. sph. to −0.50D. sph. ⊂⊃ −0.25D. cyl. ax. 180°			
Mixed astigmatism −0.25D. to +0.50D. cyl. ax. 180°		2	8

Fields—all normal excepting for 2 cases showing 10° red contraction.

Fundi—all normal (one case of persist. med. nerve fibers).

Other ocular pathology—two cases of conjunctivitis.

The media and fundi in the normal-vision group were normal. In the subnormal-vision group there was one case of congenital coloboma of the macula of the left eye, one of pseudoneuritis, and three of tortuosity of the retinal vessels, all combined with a high refractive error.

The fields were normal for form and

TABLE 2

OBESITY (FRÖLICH'S)

	Fundus—63 Cases	Fields—34 Cases
In the normal-vision group	Normal	Normal
In subnormal-vision group	1 congenital coloboma of macula 1 pseudoneuritis 3 cases with tortuosity of retinal vessels; all with high refractive error	Normal, excepting 3 cases with 10° contraction of red 2 cases with 10° F & R contraction 2 cases with 10° F contraction

TABLE 4

HYPOTHYROID

Case	Vision	Refraction		Fundus	Fields	Other Pathology
		Sphere	Cylinder			
J.F.	R 1.5−4	1935		Normal	1940	None
14 yrs.	L 0.2	R+1.25D L+3.50D.	+0.25D.		Normal	Amblyopia ex anopsia
19 yrs.		1940 R+1.00D. L+3.00D.	+0.25D			
E.S.	No coöp.	R+2.00D.			At 13 & 18 yrs.	
13 yrs.		L+2.25D.	+0.25D.		no coöp.	
18 yrs.	R 0.5+2 L 0.4+2					None
20 yrs.	R 0.8 L 0.8−3	R+1.75D. L+1.75D.			At 20 yrs. F & R normal	

red in all the normal-vision group. In the subnormal-vision group, the fields were normal in all except three cases, in which there was a 10-degree contraction of the red field and two cases of 10-degree contraction of the form and red field. In no case was there more than a 10-degree contraction. Whenever any question of the accuracy of the fields occurred the patients were recalled and the field studies were repeated. Some of those with a 10-degree contraction failed to reappear; had the opportunity for retaking their fields presented itself these would have most likely approached nearer to normal. The hand perimeter or the Ferree-Rand or both were used for the taking of the fields. No other ocular pathology was found in this group.

In the group presenting less-than-normal stature, presumably of pituitary origin (table 3), there were 17 patients, 9 males and 8 females. Of these, 12, or 70 percent, had normal vision in both eyes and 4 had subnormal vision in both eyes; only 1 patient had less than 0.5 vision in one eye. Twelve patients were refracted. Of these 16 eyes (66 percent) had more than 2 diopters of refractive error, simple or compound, the highest error being +5.00D. sph. ⊂ +0.50D. cyl. Nineteen eyes were hyperopic, three eyes myopic, and two eyes had mixed astigmatism. The media and fundi were normal in all

TABLE 5

HYPOTHYROID

Case	Vision	Refraction		Fundus	Fields	Other Ocular Pathology
		Sphere	Cylinder			
D.J. (M)	1936					
8 yrs.	R 1.2		R−0.25D.	Normal		
	L 1.2	L+0.50D.				
	1937					
	R 0.5−1	R−0.75D.	+0.50D.			
	L 0.5+1	L−0.50D.	+0.25D.			
	1940				1940	
	R 0.2+1	R−3.25D.	−1.00D.		Form, 10° contraction; red, normal	None
	L 0.2	L−3.25D.	−0.50D.			Prog. myopia
	1941					
	R	R−4.00D.	−0.75D.			
		L−4.00D.	−0.75D.			

TABLE 6

HYPOTHYROID

Case	Vision	Refraction		Fundus	Fields	Other Ocular Pathology
		Sphere	Cylinder			
F.S. (F)	1934				1934	
6 yrs.	R 0.6	R+2.00D.		Normal	Multiplicity of of retinal vessels	
	L 0.8	L+1.50D.				
1942	R 0.8+					
14 yrs.	L 0.8+				Normal	
V.K. (F)	R 0.4−2	R−1.50D.	+1.75D.	Apparently OK.	No coöp.	
1933	L 0.3	L−1.50D.	+1.75D.	Horizontal nystagmus		
12 yrs.						
1937	R 0.4−2	R−1.75D.	+1.25D.			
16 yrs.	L 0.4−1	L−1.75D.	+1.50D.	Neg.	No coöp.	
1942	R 0.3	Did not return for		Temp.	1942	
20 yrs.	L 0.3	hom. refr.		Conus of both discs	5–10° contr. of form; red normal	

cases; in one case there was a narrow rim of persistent medullary nerve fibers. The fields were normal for form and red in all cases except two in which there was a 10-degree concentric contraction of the red fields. In this group is included the patient whose roentgenogram showed a calcified shadow in the sella. Her vision was 1.5 in each eye; she had moderate compound hyperopic astigmatism; the fields, taken in 1936, 1940, and 1941, were at all times normal for form and red.

In the thyroid-deficient group (tables 4 to 8), there were eight cases. In two no visual record was obtainable because of lack of coöperation. In none was there normal vision in both eyes. One patient had normal vision in one eye; five had subnormal vision in both eyes. Of these half had less than 0.5 vision in one or both eyes. In one case a visual record was impossible when the patient was first seen at 13 years of age, but at 18 years he cooperated sufficiently for the reading. All eight patients were refracted. Of these,

TABLE 7

HYPOTHYROID

Case	Vision	Refraction		Fundus	Fields	Other Ocular Pathology
		Sphere	Cylinder			
D.V. (M)		R+0.75D.	+0.50D.	Neg.	No. coöp.	15° L. diverg. strabismus
1938		L+0.50D.	+0.50D.			
4 yrs.						
1942	R 0.5−1	R+0.25D.				
8 yrs.	L 0.3	L+0.25D.			No. coöp.	
F.D. (M)	No. coöp.					
1940			+0.25D.	Med. n.	No. coöp.	Widening of palp. fissure, 1 to 2 mm. space between limbus lid margin
22 yrs.			+0.25D.	Fundi neg.		
1942		R+0.50D.	+0.50D.			Exophthalmometer R 19; L 20
		L+0.50D.	+0.50D.			
E. D.	No. coöp.	R+2.25D.		Neg.	No. coöp.	None
13 yrs.		L+2.25D.				

TABLE 8

HYPOTHYROID—8 CASES

	Cases	Eyes
Normal vision in both eyes	0	
Normal vision in one eye	1	
Subnormal vision in both eyes	5	
No visual record obtainable	2	
Less than 0.5 in both eyes	3	
Less than 0.5 in one eye	1	
Refracted	8	
Cases with 2 or more refraction data	6	
Hyperopic eyes (Simple and Compound, 6 cases)		12
Myopic eyes (Simple and Compound, 1 case) Progressive Myopia		2
No. of mixed astigmatism (1 case)		2

Fundus findings—normal in 8 cases: 1 case—temporal conus.

Fields—normal in 3 cases; 2 cases 10° contraction of form; red fields normal; 3 cases—no coöperation.

Other ocular pathology—1 case divergent strabismus; 1 case apparent exophthalmos; 1 case nystagmus.

four had two refraction records ranging from two- to seven-year intervals, and one had four refractions during a period of five years; the latter patient had progressive myopia. We are showing the results of the refraction findings in tabular form. In six cases there were more than 2 diopters of refractive error; the highest being −4.00D. sph. ⌯ −0.75D. cyl. Twelve eyes were hyperopic, simple or compound, ranging from +0.25D. sph. to +3.50D. sph. One patient was myopic; one had mixed astigmatism. The media and fundi were normal in all cases except one in which there was a slight temporal conus. The fields were normal in three cases; in two there was a 10-degree contraction of the form field, the red field being normal; three patients did not cooperate. Among these were the two brothers, 13 and 24 years old, respectively. The younger showed a slightly higher mentality than his older brother. The older also had a widening of the palpebral fissures at times, presenting the appearance of exophthalmos. The exophthalmometer readings, however, were R. 19

TABLE 9

HETEROGENOUS GROUP—10 CASES

Type	Vision	Refraction		Fundus	Fields	Other Ocular Findings
		Sphere	Cylinder			
W.F. (M) 16 yrs. Hypogonadism	Normal	R+1.00D. L+1.50D.	+0.50D. +0.50D.	Normal	Normal	None
L.M. (M) 24 yrs. Hypogonadism	Normal			Normal	Normal	None
E.D. (M) 17 yrs. Hypogonadism & Gynecomastia	Normal			Normal	Normal	None
D.M. (M) 11½ yrs. Sexual precocity	R=0.8 L=0.8			Normal	Normal	None
B.C. (F) 7 yrs. Sexual precocity	R=0.2 L=0.2	R+0.25D.	+5.00D. +5.00D.	Normal	Didn't return	None
J.L. (M) 3 yrs. Sexual precocity	No coöp.	Did not return.		Normal	No coöp.	None
C.S. (M) 13 yrs. Gigantism & epilepsy	No coöp.	R+3.50D. L+4.00D.	+1.00D. +0.75D.	Normal	No. coöp.	None
S.S. (M) 18 yrs. Gigantism	R=0.3 L=1.0+	R+0.75D. L+0.75D.	+0.50D. +0.50D.	Normal	Form, normal	None
L.G. (F) 10 yrs. Pseudo-hermaph.	R=5/200 L=7/200	R−3.50D. L−3.50D.		Normal	5–10° contraction of F. & R.	None
P.M. (M) 5 yrs. Pseudo-hermaph.	Normal	R+0.25 L+0.75		Normal		Head tilted to L visual axis

and L. 20. At other times his palpebral fissures were normal, and the upper lid margin covered the upper limbus. There were no other signs of exophthalmos. In this group there was one case of divergent strabismus, and one of ocular nystagmus.

In the heterogenous group (table 9) there were three cases of hypogonadism; in one of these there was bilateral gynecomastia. All three patients had normal vision and one was refracted and showed a moderate compound hyperopic astigmatism. The media, fundi, and fields were normal in all three cases and there was no other ocular pathology. Of the two cases of gigantism, the patient in one showed no coöperation in the testing of vision and fields; the other had normal vision in one eye. Both had compound hyperopic astigmatism. The fundi were normal in both and one had normal form and red fields. There were three cases of hypergenitalism, two in males, 3 and 11½ years old, respectively, and one in a female 7 years old. The vision of the older was 0.8 in each eye; the younger did not coöperate. The fields of the older were normal for form and red. The girl had 0.2 vision in each eye and had +5.00D. hyperopic astigmatism in each eye. She did not return to have her fields tested. The fundi in all three cases were normal; no other ocular pathology was found in this group.

Of the pseudohermaphrodites, 5 and 10 years of age, the younger had normal vision and was slightly hyperopic; the older had 5/200 and 7/200 vision and refraction showed −3.50 diopters of myopia. The older showed a 5- to 10-degree concentric contraction of the form and red fields. The fundi were normal in both. The younger tilted the head to the left.

Summary and Conclusions

The obesity (Fröhlich's?) patients are no different as to their ocular findings from any other normal group.

The children who are of less-than-normal stature (pituitary origin), also do not vary as to their ocular findings from any other normal group. No evidence was found of visual disturbances from presumably altered secretions of the pituitary gland.

The visual acuity of the hypothyroid patients, as a group, was below normal. Of these, 75 percent were hyperopic and 75 percent had more than 2 diopters of refractive error. Only one of the eight children was myopic.

In the heterogenous group there were no pathologic ocular findings. The altered secretions causing the various abnormalities have apparently no effect upon the eye.

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RESULTS OF GLAUCOMA SURGERY*

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Some years ago, under the able guidance of the late Dr. Webb W. Weeks, a glaucoma clinic was established at Bellevue Hospital, and studies of various aspects of the glaucoma problem were initiated. One phase of the work, postoperative glaucoma, has already been reported.[1]

This report contains a study of some of the results of glaucoma surgery done at Bellevue Hospital during the years 1935 to 1939, inclusive. In this five-year period 234 major operative procedures (exclusive of paracenteses and posterior sclerotomies) were carried out for all types of increased intraocular pressure. Of this number I am reporting the operative results in 54 cases of primary glaucoma. Of these, 31 were cases of chronic congestive glaucoma, 12 of chronic simple glaucoma, and 11 of acute congestive glaucoma. The ratio of incidence of chronic congestive to chronic simple glaucoma cases, more than 2.5 to 1, is rather surprising and is the reverse of what one would normally expect. Duke-Elder[2] in his discussion of the chronic glaucomas states that glaucoma simplex is "by far the commoner variety." However, since the number of cases reported here constitutes only 23 percent of the total operations performed during this period, this ratio need not be taken as typical of the total incidence. Furthermore, Grosz[3] in a series of 4,310 cases of primary glaucoma found that 40.5 percent were of the chronic inflammatory type, while only 14.6 percent were cases of chronic simple glaucoma.

I have chosen for this report only those cases in which sufficient preoperative and postoperative data as to tension, vision and fields were available to give the report some significance. Moreover, only those cases are included which have been followed for at least six months. Admittedly this is not a long time. However, of the total of 54 cases, only 12 were followed for as little as six months, the rest were followed for at least one year and 33 (over 60 percent) were followed from two to six years. Considering the migratory character of our clinic clientele, the latter achievement constitutes something of a minor miracle.

The majority of these operations were performed by the house surgeons under the supervision of the attending staff. A few were done by staff members. This work is therefore representative of some 12 to 15 different surgeons.

Table 1 gives the final results obtained in the three main types of primary glaucoma with all kinds of operative procedures. In the chronic glaucomas, congestive and simple, results are expressed in terms of final tension, vision, and fields. In the case of the acute congestive type only final tensions are reported, since in many cases data as to vision and fields before the onset of the acute attack were unobtainable. Normal tension as used here means 25 mm. of Hg or less, as obtained with the Schiötz tonometer. In some cases miotics were used to maintain this level postoperatively.

It will be noted that of 31 cases of chronic congestive glaucoma followed from one-half to six years, the tension was normalized in 22 cases (70.9 percent) following operation. But the vision was the same or better in only 17 cases (54.8 percent), and the fields were maintained

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TABLE 1

SURGICAL RESULTS IN VARIOUS TYPES OF PRIMARY GLAUCOMA

Type of Glaucoma	No. of Cases	Years Followed	Tension Normal* No. and Percent Cases	Vision Same or Better No. and Percent Cases	Fields Same or Better No. and Percent Cases	
Chr. cong.	19	½–2	14=73.2	12=63.2	10=52.6	
Chr. cong.	12	3–6	8=66.6	5=37.5	3=26.3	
	31		22=70.1	17=54.8	13=41.9	Totals chr. cong. glaucoma
Simplex	12	½–3	9=75.0	7=58.3	6=50.0	Totals chr. simp. glaucoma
			31=72.1	24=55.8	19=44.2	Totals chronic glaucoma
Acute cong.	11	½–5	8=72.7			
	54		39=72.2			Totals primary glaucoma

* Normal tension = 25 mm. Hg or less, obtained with Schiötz tonometer with or without miotics.

in only 13 cases (41.9 percent). Furthermore, the results in those cases that were followed from three to six years are poorer in all respects than those followed from one-half to two years only. This diminution in percentage of successful results the longer the cases are followed is a constant feature of glaucoma surgery and is to be noted in many reports. As early as 1908 Schmidt-Rimpler[4] stated somewhat sadly, "Je länger man beobachtet, um so kleiner wird die Zahl der als dauernd zu bezeichnenden Heilungen."

The successful results among the 12 cases of glaucoma simplex followed from one-half to three years were slighlty better but also showed a relative decline in terms of tension (75 percent), vision (58.3 percent), and fields (50 percent). Of the 11 cases of acute congestive glaucoma followed from one-half to five years, normal tension level was maintained in 8 (72.7 percent), with and without miotics. Of the total of 54 cases of primary glaucoma reported, a normal tension level was retained in 39 (72.2 percent), with and without miotics.

In table 2 the data have been rear-

TABLE 2

RESULTS OF PRIMARY GLAUCOMA SURGERY WITH VARIOUS TYPES OF PROCEDURES

Type Glaucoma	No. of Cases	Preop. Tension			Preop. Vision			Preop. Fields			Operation	Years Followed	Cases with Normal Tension* percent	Cases with Vision Same or Improved percent	Cases with Fields Same or Improved percent
		I	II	III	1	2	3	A	B	C					
Chr. conges.	8	4	2	2	4		4	1	2	5	Trephining	3–6	75.9	37.5	16.7
Chr. conges.	7	5	2		2	2	3	1		6	Trephining	½–2	71.5 =70.1	42.9 =50.0	28.6 =28.8
Simplex	7	4	3		3	3	1	2	2	3	Trephining	½–3	71.5	71.4	42.9
Acute	2		1	1							Trephining	½–4	50.0		
Chr. conges.	3		1	2	2	1		1	1	1	Lagrange	3–6	66.6	50.0	66.6
Chr. conges.	9	5	2	2	3	2	4	5	1	3	sclerectomy	½–2	66.6 =70.6	77.7 =61.8	66.6 =64.7
Simplex	5	2	2	1	5			2	1	2		½–3	80.0	40.0	60.0
Acute	4	1		3							Iridectomy	2½–5	75.0 =75.0		
Acute	4			4							Iridectomy	½–2	75.0		
Chr. conges.	1		1				1		1	1	Cyclodialys.	3–6	100.0 =66.6	100.0 =66.6	100.0 =66.6
Chr. conges.	2	1		1			2			1	Cyclodialys.	½–2	50.0	50.0	50.0
Chr.conges.	1		1			1				1	Iridotasis	1	100.0 =100.0	100.0	100.0
Acute	1			1							Iridotasis	3	100.0		

* Normal tension = 25 mm. H g or less, as obtained with the Schiötz tonometer, with and without miotics.

ranged according to the type of operative procedure used. Also, the cases have been analyzed and their preoperative status classified according to tension, vision, and fields following, with minor exceptions, the method of Gjessing[5] as described below.

Tension Class

I = Up to 35 mm. Hg (Schiötz)
II = 35-55 mm. Hg
III = Over 55 mm. Hg

Vision Class

1 = 20/20 to 20/40 with correction
2 = 20/40 to 20/200 with correction
3 = Less than 20/200

Fields Class

A = Form fields normal to 20 degrees' contraction from periphery in any cardinal meridian; or enlargement of the blind spot to 15 degrees in any direction; or both.
B = Contraction of form fields to not more than 20 degrees from fixation in any cardinal meridian, with attendant additional enlargement of the blind spot.
C = All contractions greater than B.

The total averages in table 2 are weighted not simple averages; that is, they are obtained by multiplying each component average by its related number of cases. These products are then added together and the resultant divided by the total number of cases involved. This method of calculation gives a far more accurate picture than that obtained by the simple addition of averages and division by the number of averages used. The same method was followed in all subsequent calculations in tables 3 to 6.

It is granted at the outset that there are far too few cases here for the drawing of any decisive conclusions. However, even with this small amount of material certain trends are visible. A study of table 2 will disclose that as far as reduction of tension is concerned, better results were obtained with iridectomy in acute glaucoma (75 percent) than with trephining (70.1 percent) or the Lagrange sclerectomy (70.6 percent) in chronic glaucoma. These figures will not surprise ophthalmologists, since it is generally conceded that von Graefe's 85-year-old iridectomy not only was the first but is still the most successful surgical procedure in glaucoma. Iridotasis gave better results (100 percent) and cyclodialysis worse (66.6 percent), but with only two and three cases, respectively, involved these averages are not worth considering.

It will be noted that here again maintenance of vision and fields lags behind maintenance of normal tension. The markedly higher percentage of field maintenance obtained with the Lagrange sclerectomy (64.7 percent) as compared with the Elliot trephining (28.8 percent) may seem surprising at first. However, a study of the preoperative perimetric status of the patients shows that of the 22 cases of chronic glaucoma in which the trephine was used, Class C fields were present in no less than 14 (63.6 percent). In the case of the Lagrange sclerectomy there were only 6 (35.3 percent) Class C fields. This bears out the findings of Burke[6] and Reese,[7] who showed that the percentage of progressive deterioration of perimetric fields following successful operative reduction of tension was much greater in cases in which there were advanced field changes than in those with early field changes.

Comparative statistics

In order to obtain a basis for comparative evaluation, I have reviewed the published results of glaucoma surgery for the past 15 years. For purposes of easier analysis this mass of material has been divided into two separate groups, table 3[5 to 64] and table 4.[65 to 81] While these lists are not completely exhaustive they do represent a substantial majority of the reported results of glaucoma surgery from 1928 to date.

TABLE 3

SUMMARY OF POSTOPERATIVE RESULTS OF GLAUCOMA SURGERY REPORTED SINCE 1927

Ref.	Type Glaucoma	Preop. Status	Operation	No. of Cases	Percent Success	Time Followed	Criteria of success
5	Chronic	Three classes according to T, V, F I II III	Iridencleisis	92	83.7 83.7 76.0	7 mos. to 11 yrs.	T = N without miotics. V and F = same or imp.
8	Primary and secondary	Av. T = 47.3 Av. T = 39.8	Trephining	72 35	84.7 91.4	3 to 15 yrs. 4 mo. to 2 yrs.	T = 18 or less V & F = same or better
9	Primary and chronic	V = 6/6 to 6/12 V = 6/18 to 6/60 V = under 6/60	Trephining	154 104 147	80.5 84.6 ?	5 yrs.	V = same or imp. T = N to fingers
10	Chronic		Trephining	48	80.0		
11	Noninfl. chr. Infl. chr. Acute Simplex Miscell.		Iridencleisis	60 7 11 4 19	85.1	6 mo. to 6 yrs.	T, V, F same or better. Good bleb
12	Simple Inflammat. Secondary		Cyclodialysis	46 3 2	45.0	½-5 yrs.	T = N
13	Acute Subacute Chronic		Trephining	38 14 48	57.9 85.7 87.7		V = same or imp. or slightly worse
14	All types		Iridotasis	100	Good	Up to 4 yrs.	T "down," V = same or imp. F = no marked contraction.
15	All but acute		Iridotasis	105	Good		T = N
16	Chronic		Lagrange sclerec.	3	100.0	18 mos.	T = N, V and F unchanged
17	Compensated Uncompensated Compensated Uncompensated	Private pts. Clinic pts.	Cyclodialysis	60 36 220 128	72.0 70.0 79.0 68.8	½ to 20 yrs. 1 to 2 yrs.	T = N
18	Chronic, acute, simple	T, V, F studied preop.	Iridencleisis	42	78.0	Over 6 mos.	T = N V = same or imp.
19			Trephining	96	63.2		T = N
20	Acute Chronic Absolute Secondary		Iridotasis	10 10 10 10	60.0 100.0 100.0 90.0		T = N?
21	Chronic		Trephining	50	70.0	Up to 10 yrs.	T = N V not worse
22	Simple		Sclerectomy Iridencleisis	493 81	54.1 70.0	1 to 5 yrs. Over 1 yr.	T = N without miotics; V = same or imp.
23	Chronic		Cyclodialysis	9	89.0	1 to 3 yrs.	T = N
24	Acute Chronic		Iridencleisis	15 18	100.0 100.0	1 to 23 mos. 2 to 11 mos.	T = N or less
25	Simple	T, V, F studied	Cyclodialysis	27	77.8	1 to 7 yrs.	T = N, V = same F = little or no decrease
26			Cyclodialysis	30	100.0?	?	?
27	Acute Chronic Hemor. & Sec. Acute		Iridencleisis Trap-door Irid.	12 44 4 18	83.3 93.2 50.0 83.3	Up to 6 yrs. ?	T = N V = not worse ?
28	Chronic		Trephining Lagrange Iridectomy Trephining Trephining	16 3 1 11 15	80.0 100.0 33.0	2 wks. to 5 yrs. 5 to 10 yrs. 10 to 19 yrs.	V = same

TABLE 3—*Continued*

Ref	Type Glaucoma	Preop. Status	Operation	No. of Cases	Percent Success	Time Followed	Criteria of Success
29	Chronic inflammatory		Trephining Cyclodialysis	649 300	83.0 50.0	? 5 yrs.	T =lowered T =lowered
30	Simplex		Iridencleisis	19	74.0	14 to 38 mos.	T =27 or less V, F not worse
31	Simplex Simplex Acute		Holth sclerect. Trephining Iridectomy	81 151 32	47.0 48.0 62.5	3 yrs. 3 to 10 yrs.	T =27 or less V, F not worse
32	Simplex		Holth sclerect. Iridencleisis	215 81	54.1 82.7	At least 1 yr.	T =low (miotics) V =not worse
33	Simplex		Trephining Iridencleisis Iridectomy	40 28 1	62.0 57.0 100.0		
	Acute		Trephining Iridencleisis Iridectomy	9 1 18	44.0 100.0 67.0	At least 1 yr.	T =27 or less V, F not worse
	Chr. inflamm.		Trephining Iridencleisis Iridectomy	13 2 3	39.0 100.0 33.0		
34	?		Lagrange Trephining Szymanowski Tre. Iridotasis Lagrange-tasis Iridectomy Reese iridectomy	5 76 4 80 31 31 28	40.0 63.0 25.0 59.0 60.0 66.0 53.0	Av. =21 mos.	T =25 or less
35	?		Iridencleisis	233	85.0	Up to 23 yrs.	T =N (miotics)
36	Simplex Chr. inflamm. Sec. & Cong.		Cyclodialysis	74 58 34	68.9 68.9	1 to 4 yrs. 1 to 4 yrs. 20 yrs.?	V =not worse T =improved
37	Acute		Cyclodialysis	10	90.0	½ to 1½ yrs.	T ="less"
38	Chronic	F =good, T =35 with miotics	Lagrange Trephining Iridectomy Cyclodialysis Iridotasis	95 80 12 8 5	89.5 75.0 40.0 62.5 100.0		
39	Chr. simp.	V =5/10 to H.M. T =40 to 90	Cyclodialysis	17	85.0		
	Chr. simp.	V =5/10 to 5/10 T =42 to 60	Cyclodialysis	6	100.0	1 to 15 mos.	T ="down" V =not worse
	Secondary	V =4/5 to L.P. T =50 to 90	Cyclodialysis	10	40.0		
	Absolute	T =60 to 93	Cyclodialysis	6	50.0		
40	Simplex	Stage I* Stage II† Stage III‡	Iridencleisis	71 161 49	79.4	4 years	T =N V not worse
41	Primary		Cyclodialysis	220	100.0?		
42	Chronic	V =20/20 to 1/100	Trephining	25	100.0?	3 to 12 yrs.	T =10–18 F =same V ="good"
43	Chr. Simple Acute Secondary Hemorrhagic Capsular Buphthalmos		Iridotasis	20 6 3 4 1 2	100.0 100.0 66.0 100.0 100.0 50.0	Up to 11 yrs.	T =relieved
44	Buphthalmos	V, T, F given where possible	Iridencleisis	5	60.0	5 mos. to 2 yrs.	
45			Trephining Iridencleisis	305 137		Up to 25 yrs.	
46	Comp. and Uncompensated		Trephining	150	80.0	1 to 10 yrs.	T =Regulated

TABLE 3—*Continued*

Ref.	Type Glaucoma	Preop. Status	Operation	No. of Cases	Percent Success	Time Followed	Criteria of Success
47	Compens., Uncomp., and Absolute		Trephining	31	V = 82.0 T = 100.0	1 to 4 yrs.	V = same T = N
48	Comp. Decompensated Absolute		Sclerectomy ab externo	16	100.0	Up to 1½ yrs.	T = regulated
49	Simple Chronic Secondary		Cyclodialysis	54	99.0	Few mos. to 1½ yrs.	T = N V, F not worse
50	All kinds		Sclerectomy	31	97.0	3 wks. to 2¼ yrs.	T = controlled
51	Acute		Iridectomy Sclerectomy Trephining	37 4 2	95.6 100.0 0	2 to 9 yrs.	T = N
	Chr. primary		Trephining Sclerectomy Iridectomy Iridencleisis Cyclodialysis	89 29 12 7 9	79.0	2 to 9 yrs.	
52	Chronic		Trephining and Sclerectomy	122	87.6	"A short time"	T = N
	Chronic		Cyclodialysis	34	87.0	"A short time"	T = N
53	Primary Secondary Acute		Iridocorneo-sclerectomy	38 26 4	86.8 73.1 75.0	4 mos. to 11 yrs.	T = N
54	Acute & Chr.		Iridencleisis	200+	95.0	Up to 5 yrs.	
55	Chr. primary Postoperative		Cyclodialysis Cyclodialysis	34 21	79.0 62.0	1 to 7 yrs. 1 to 11 yrs.	T = N, V = same T = N, V = same
56	Primary	V = 0.1 or better	Iridectomy Trephining Lagrange Cyclodialysis Iris Inclusion Holth sclerect.	11 70 4 1 1 8	55.0 68.5 75.0 0 100.0 100.0	1 mo. to 20 yrs.	
		V = less than 0.1	Iridectomy Trephining Lagrange Cyclodialysis Holth sclerect.	4 30 8 3 3	50.0 50.0 25.0 33.0 0		
57	Chronic Chronic Absolute		Iris incarcer.	22 13 14	89.0 92.0 71.0	13 mos. to 5 yrs. 1 to 6 yrs. 20 mos. to 6 yrs.	T = 20 or less
58	Primary		Iridencleisis	107	87.8		T = N
59	Acute		Iridectomy Trephining Lagrange Cyclodialysis	55 30 5 7	73.0 80.0 40.0 43.0		
	Chr. congest.		Iridectomy Trephining Lagrange Cyclodialysis	63 41 15 5	83.0 71.0 40.0 0	2 to 9 yrs.	T = below 25 with and without miotics
	Simple		Iridectomy Trephining Lagrange Cyclodialysis	99 224 24 32	61.0 74.0 71.0 44.0		
60	Chr. primary		Iridencleisis	198	73.2	6 to 280 mos.	T = N; V & F = same or better
61	Simplex Chronic Secondary Absolute Buphthalmos	V, T stated	Trephining	123 35 67 7 12	91.0 54.0 59.0 43.0 45.0	½ to 10 yrs. ½ to 10 yrs. ½ to 10 yrs. Over 1 yr.	T = N
62	Simple and Subacute		Iridencleisis	72	96.0	2 to118 mos.	T = N in 96% V = same in 88% F = same in 89%

TABLE 3—*Continued*

Ref.	Type Glaucoma	Preop. Status	Operation	No. of Cases	Percent Success	Time Followed	Criteria of Success
63	Simple	T stated	Mod. Lagrange	50	90.0	6 mos. to 8 yrs.	T = N
64	Acute Chronic Chronic	T, V, F stated	Iridectomy Lagrange Trephining	56 217 302	89.0 93.0 96.0	2 to 20 yrs. 2 to 20 yrs. 2 to 18 yrs.	Reduced T?
6			Trephining or Lagrange	48	50.0	Over 5 yrs.	F = same T = under 26
7	Primary	Early field change Late field change		51 90	90.0 28.0	5 yrs.	"Disease arrested"
				9,313 −794			
			Total	8,519	74.86		

T = tension.
V = vision.
F = fields.
N = normal.
imp. = improved.
Av. = average.

*V = Normal to 5/30. Fields = not restricted more than 20 degrees.
†V = 5/30 to 2/60. Fields = "more restricted."
‡V = less than 2/60, or almost absolute glaucoma, or absolute glaucoma.

Table 3 lists 9,313 cases of all types of glaucoma in which all the various "classic" operative procedures were used. Of this number 794 cases could not be included in the calculations because final results were either not stated at all or not given accurately. This left 8,519 cases in which, on the basis of weighted averages, 74.86 percent of the results were reported as successful following operation.

Table 4 includes those cases in which more than one basic operative procedure was used simultaneously and also the newer procedures, relatively few cases of which have been reported thus far. In this group 490 cases with a successful operative result of 78.2 percent are listed, also on the basis of weighted averages.

In table 5 the data of table 3 have been regrouped as far as possible into the various types of glaucoma and also according to the type of operative procedure used. Since not enough detailed information was given in all reports, this table includes only 7,232 cases of the total of 9,313 listed in table 3. It will be noted that in the cases of chronic simple glaucoma the iris-inclusion operation was reported as most successful (76.8 percent of 494 cases), while cyclodialysis was least successful (61 percent of 179 cases). With chronic congestive glaucoma, anterior sclerectomy proved most successful (86.9 percent of 484 cases), the iris-inclusion operation running a close second (84.6 percent of 628 cases). Iridectomy and again cyclodialysis gave the poorest results in this type of glaucoma with 72.1 percent successes in 106 and 1,151 cases, respectively. In the acute glaucomas the iris-inclusion operation again led in percentage successes with 86 percent in 55 cases, while iridectomy was next with 79.8 percent successes in 216 cases. Trephining gave the worst results in this type of glaucoma (63.3 percent success in 79 cases). Too few cases of absolute, secondary, and the like, glaucomas are reported accurately to be of value statistically, although here again it will be noted that the iris-inclusion operation appears to the best advantage.

That iridectomy was much more successful in acute glaucoma (79.8 percent) than in chronic congestive glaucoma (72.1 percent) and chronic simple glaucoma (61.4 percent) was to be expected. Similar results were reported as early as 1908 by Schmidt-Rimpler[4] who found 80 per-

TABLE 4

SUMMARY OF POSTOPERATIVE RESULTS OF GLAUCOMA SURGERY REPORTED SINCE 1927; COMBINED AND NEWER PROCEDURES

Ref.	Type Glaucoma	Preop. Status	Operation	No. of Cases	Percent Success	Time Followed	Criteria of Success
65			Cyclodialysis with conjunctival drain	20	80.0	Over 3 mos.	
66			Sclero-ciliarotomia-ignea	19	100.0		
67			Subscleral iridencleisis	4	75.0	?	
68			Iridotorsion	53	100.0?		
69		Anatomic classification*	Peripheral iridotomy	18 15	77.0 0	Up to 10 yrs.	T(McLean) = up to 31
70	Acute, Chronic and Secondary		Subscleral iridencleisis	24	83.0	1 wk. to 10 mos.	T = N V = unchanged
71	Simple	T, V, F given	Cyclodialysis with iridectomy	6	83.0	3 wks. to 5 mos	T, V, F same
72		Hopeless—eyes previously operated on	Cyclodialysis with iridectomy	57	54.0	Up to 4 yrs.	T = 26 or less
73			Horse-hair seton	11	100.0	11 days to 20 mos.	
74	Chronic and and Secondary	T, V, F given Status of angle	Goniotomy	11	90.0	1 wk. to 10 mos.	
75			Cyclodialysis with iridectomy	24	87.5	"Past 3 yrs."	
76	Absolute and Secondary		Horse-hair seton	30	100.0	Up to 3 yrs.	
77	All kinds	Well described	Cyclodiathermy puncture (repeated)	47	72.3	3½ wks. to 3 yrs.	T, V = N
78	Chronic and Subacute	Previously operated on—mostly	Cyclodialysis with Mg. implant	12	"Majority"	Up to 16 mos.	T = N?
79	Chronic		Suprachoroidal iridotasis	77	97.0?	3 to 13 yrs.	T = N
80	All kinds	T, V given	Transcorneal cyclodialysis	41	52.0	1 to 24 mos.	T = N
81			Cyclodialysis with sclerect.-irid.	21	100.0	"Up to several months"	T = N
			Total	490	78.2		

T = tension.
V = vision.
F = fields.
N = normal.
* = Eyes classified according to size of cornea, color of iris, and depth of anterior chamber.

TABLE 5

RESULTS OBTAINED WITH VARIOUS OPERATIONS IN THE DIFFERENT TYPES OF GLAUCOMA DURING THE PAST 15 YEARS

Operation	Chr. Simple		Chr. Cong.		Acute		Absolute		Secondary		Miscell.	
	No. Cases	% Succ.	No. Cases	% Succ.	No. Cases	% Succ.	No. Cases	% Succ.	No. Cases	% Succ.	No. Cases	% Succ.
Iridectomy	100	61.4	106	72.1	216	79.8						
Trephining	538	69.7	2034	82.0	79	63.3	9	55.7			79	56.9
Ant. sclerect.	863	55.9	484	86.9	13	69.0			26	73.0		
Iris inclus.	494	76.8	628	84.6	55	86.0	24	83.1			48	79.5
Cyclodialysis	179	61.0	1151	72.1	17	70.7	6	50.0	33	54.6		

cent, 53 percent, and 33 percent successful results obtained with iridectomy in acute, chronic congestive, and chronic simple glaucoma, respectively. It must also be noted that the even better results obtained with the iris-inclusion operation in acute glaucoma may bear out the early contentions of Coccius,[82] Bader,[83] and others that reduction of tension obtained with iridectomy in acute glaucoma is due to the partial incarceration of iris tissue.

Also not unexpected is the finding that (with the exception of the iris-inclusion operation) the filtering techniques found their most successful use in the chronic glaucomas. Somewhat more unusual, however, is the relatively poorer showing made by all these procedures in the cases of glaucoma simplex as compared with the chronic-congestive glaucomas. The difference is so marked and so uniform as to merit—in such a large series of cases—more than passing attention, especially since Duke-Elder[84] suggests that the prognosis is poorer in the chronic congestive type of glaucoma. Here, too, the iris-inclusion procedure seems to have made the best showing.

In 1927 Wilmer[8] summarized the results of glaucoma surgery during the previous 15 years. I have taken the liberty of abstracting the more important figures from his report and listing them in the first two columns of table 6. The third and fourth columns in this table are compiled from table 3 and include 8,373 cases in which the type of procedure used was ascertainable. Table 6 is therefore a fairly representative cross-section of the results of glaucoma surgery for the past 30 years.

On the basis of weighted averages Wilmer's figures show successful results in 75.36 percent of 6,607 glaucoma patients operated on in the 15 years prior to 1927. This figure is almost identical with the 75.71 percent of successes in 8,373 cases reported for the following 15 years. This close identity of results is not only surprising but appears to show that there has been no improvement in the over-all results of glaucoma surgery during the last 15 years over the previous 15 years on the basis of reported statistics.

The percentage of successful results shown in table 4 (78.2 percent in 490 cases) is somewhat better but is less significant since this table represents the results not only of combined but also of newer procedures which have not yet been fully subjected to the test of time. As Reese[7] states, ". . . the newer procedures are usually used sporadically, frequently on advanced cases . . . and are often reported in small series of cases which have not been followed up adequately."

A closer scrutiny of table 6 will show that in the 15 years prior to 1927 trephining was the most common filtering operation used, followed in turn by cyclodialysis and anterior sclerectomy, with the iris-incarceration operation a poor fourth in point of use. In the 15 years following, trephining has maintained its primary position of popularity among ophthalmic surgeons, but the iris-inclusion technique now appears to be the second choice followed by cyclodialysis and anterior sclerectomy.

According to these figures the iris-inclusion operation has been the most uniformly successful surgical procedure in glaucoma for the past 30 years, with 87.4 percent of successes in 517 cases and 81.1 percent of successes in 1,916 cases for the two 15-year periods, respectively. Iridectomy shows the poorest statistical reported results, with 63.3 percent of successes in 482 cases and 72.5 percent of successes in 449 cases for the two 15-year periods, respectively. These figures apparently contradict other results reported above as to the value of iridectomy in

glaucoma. However, this discrepancy may be explained by reference to table 5. It will be noted that despite the generally accepted fact that the sphere of usefulness of iridectomy is limited to the acute glaucomas, it still appears to be used almost as frequently in the chronic glaucomas with much poorer relative results. This has helped to reduce materially the average of successful results of this operation.

On the whole, the results reported in tables 1 and 2—as far as tension is concerned—compare with the previously reported results of glaucoma surgery appearing in table 6.

TABLE 6

RESULTS OF GLAUCOMA SURGERY DURING THE PAST 30 YEARS

Operation	1912–1926(8)		1927–1941	
	No. Cases	% Success	No. Cases	% Success
Iridectomy	482	63.3	449	72.5
Ant. sclerectomy	777 104 881*	72.8 85.5 74.3*	1,459	67.7
Trephining	179 140 3,381 3,700*	72.0 92.8 77.8 77.9*	3,045	77.7
Iris incarceration	517	87.4	1,916	81.1
Cyclodialysis	1,027	66.7	1,504	72.9
Total	6,607*	75.36*	8,373	75.71

* Calculations from Wilmer's figures by S.A.F.

EVALUATION OF STATISTICS

The mass of data compiled in tables 3, 4, 5, and 6 represents a prodigious amount of careful thought, meticulous skill, and painstaking work on the part of the world's outstanding ophthalmologists. From such an array of statistics it should have been possible to draw many important and basic conclusions. It is disappointing to report that such is not the case.

In presenting his statistics in 1927 Wilmer[8] stated, "It is well nigh impossible properly to interpret the vast amount of statistics upon the operative procedures for glaucoma." And Hepburn[85] said in discussion, ". . . my own experience has convinced me that conclusions based on numerical statistics of this nature are of little value." The statistics published in the 15 years since then are open to the same criticism.

Many of the reports are far from meeting Lagrange's[86] dictum that, ". . . good statistics, the only ones which . . . ought to be published, are those which are based on facts which have been followed a long time and which give parallel records of the acuity and tension before and after operation." A glance at table 3 will show that in many cases the type of glaucoma dealt with remains unspecified. The wide-open spaces of column 2 testify to the

lack of preoperative detail. Inspection of the next-to-the-last column discloses differences in length of follow-up varying from two weeks to 20 years. In some cases duration of postoperative observation is not mentioned at all. Finally, the criteria of success vary from the loose "relieved," "regulated," or "controlled" tension to such rigid requirements as normal tension without miotics plus unchanged vision and fields. The latter reports are in the overwhelming minority.

Such an array of figures is tempting, and all sorts of statistical tricks can be played with them. But even the few deductions which I have drawn from them are of questionable scientific value. The truth is that they are a Babel of statistical data which lack a unifying, common language. Except for the finding that the iris-inclusion technique is gaining in popularity and the cold fact that apparently little or no progress has been made in glaucoma surgery during the past 30 years, judging from the published reports, there is little of comparative worth to be gained from them. And yet much more could have been learned had these same figures been carefully compiled and based on some thoughtfully preconceived plan.

Long before the end of the 19th century it became evident (as von Graefe himself stated) that iridectomy, the then lone reliable operation for glaucoma, was not the ideal procedure for the large body of chronic glaucomas. Then during the short, fruitful span from 1903 to 1909 all the now fundamental procedures for chronic glaucoma were brought out and glaucoma surgery moved a long step forward. Since then it has remained practically rooted in its controversial tracks, unable to decide which way to go. Not only—after almost 40 years—is there no unanimity as to indications for the various types of procedures to be used but also, to judge by the literature, few seem to agree as to the effects of such procedures. And the newer techniques constantly being devised also show that there is less than complete satisfaction with existing procedures among ophthalmic surgeons.

It has always seemed, for instance, that there was at least some agreement about the outstanding value of the iridectomy operation in acute glaucoma and its therapeutic limitations to this type of the disease. Yet, as I have already pointed out, during the last 15 years iridectomy was reportedly used just about as often for the chronic as for the acute glaucomas. As to the surgery for chronic glaucoma, the literature is replete with controversial opinions:

Parsons[87] states, "Trephining is uncertain in its results . . . yet in my opinion it affords the best means on the whole yet devised for dealing with the chronic glaucoma." Wilmer,[8] Bothman and Blaess,[56] Spaeth,[88] and many others also feel that it is the best procedure. But Butler[27] believes that, "The operation is a serious insult to the eye" and that, ". . . trephining in chronic glaucoma gives an excellent percentage of good results, but the operation should be given up if a better can be found." And Constantine[58] says, "For my part after using the Elliot operation for 23 years I liked it less every year. . . ."

In regard to cyclodialysis, Wheeler[72] said, "I should not choose the traumatizing operation of cyclodialysis except in cases in which the condition is desperate and will not respond to less traumatizing and ordinarily effective procedures." On the other hand Sinclair[26] prefers cyclodialysis because, ". . . there is less actual trauma to the coats of the eye, no leaking scar or bleb is formed, and therefore a stronger eye results." Traquair[89] prefers the cyclodialysis because it is ". . . a

good and harmless operation and easy to do." And Gradle[25] says that ". . . the eye is subjected to less injury by cyclodialysis than . . . by trephining, Lagrange or any operation for cutting the iris."

In regard to the iris-inclusion procedures Whitehead[90] states, "Iris incarceration seems so unsound surgically, that I could never persuade myself to perform it." And Wilmer[8] avoided it because of the ultimate possibility of sympathetic ophthalmia and the danger of detached retina occurring many years later. On the other hand Herbert[91] states, "It is quite time that it was generally recognized that iris tissue lying in a sclero-corneal wound accomplished something in the matter of drainage, that nothing else can do. It does almost exactly what is wanted, . . . the results probably represent the highest possible limit of attainment in glaucoma treatment." And Clapp[43] believes that, ". . . while possibly it is unsurgical it gives better results than any operation so far devised." This is almost an echo of Parsons on trephining. Then there are such opinions as those of Wilder[92] and Greenwood,[93] who feel that the iris-incarceration and trephining operations are equally safe. Many other such contradictory opinions dot the literature on glaucoma.

That surgeons should prefer one type of operative procedure to another is not only understandable but to be expected. On the basis of clinical judgment and long experience almost all men have adopted certain favored techniques for certain types of cases. And it is almost axiomatic in surgery that the best results are obtained with those procedures in which the operator is most skilled and with which he has had the longest experience. What is harder to understand is this striking diversity of opinion among outstanding ophthalmologists as to the value of the various techniques. In some cases approval or disapproval is based on actual long clinical trial. On the other hand, there are but few reports in the literature indicating that the various types of procedures have been tried in concurrent series of equal numbers of cases in order to ascertain their comparative value. Most of the reported results seem to offer data on behalf of some favored type of operation and not for the purpose of comparative study. And while protagonists and antagonists of particular techniques undoubtedly have excellent reasons for their judgments, there seems to be no clear cut *statistical* evidence to warrant the wide divergence of opinion. I have looked in vain for documentation that proves indisputably that any one procedure is as good or as bad as some of the opinions of it are.

"In reading the scientific reports of operative results in glaucoma, one is impressed with the fact that von Graefe's lamented 'absence of general agreement' is more pronounced now than it was at the time he wrote," said Wilmer[8] in 1927. He might have been speaking today. The average ophthalmic surgeon or the "occasional" surgeon who seeks help from the published experiences of others is apt to come away confused rather than enlightened. And until published results are reduced to one statistical language based on common diagnostic and surgical factors such confusion will reign, and reports of results will frequently continue to be contradictory rather than complementary.

Suggested program

In order to reduce published figures to similar intercalculable entities several conditions are necessary:

1. The adoption of a standard glaucoma nomenclature.

Spaeth,[88] Gradle,[94] Grosz,[95] and numerous others have emphasized this need again and again. Grosz states, "I have of-

ten called attention to this wide disagreement in terminology and have repeatedly emphasized the necessity of clear distinction of terms made on a common basis. My efforts have been in vain, as inexact terminology still prevails. The same terms are still used in different senses by different writers. The recent introduction of new terms makes this chaos still more complicated." There can be little dispute with this opinion, for every additional system suggested for the clarification of glaucoma nomenclature, however excellent, has added another set of terms to the general confusion. The adoption of a nomenclature to fit all the important clinical manifestations is important, but even more important, perhaps, is the adoption of *one* system to the exclusion of all others in order to obviate confusion.

2. Provision of a standard preoperative classification of glaucoma cases into groups and subgroups.

The necessity for a detailed preoperative study of cases is obvious if operative techniques are to be relatively and accurately evaluated. This is especially important in the vast body of chronic glaucomas where opinions vary most and where, as Grosz[29] has stated, ". . . dans les cas de glaucoma inflammatoire chronique, les resultats, n'ont pas été satisfaisants. Or, ce sont justement ces cas, qui sont l'objet de la plupart des operations." Many have seen this need and numerous reports are to be found with excellent descriptions of the preoperative status of cases. The trouble is that such reports, excellent in themselves, are also unto themselves.

For instance, a study of the second column of table 3 will show that Wilmer[8] divided his cases preoperatively into two groups based on the height of tension, Reese[7] on the basis of early and advanced field changes, Davenport[9] and Bothman and Blaess[56] on the basis of visual acuity. Holst[22] used vision and fields as the basis of his preoperative classification, Thomsen[61] and Del Barrio[39] relied on vision and tension, and Knapp[38] on fields and tension. Gjessing,[60] Blaickner,[18] Gradle,[25] and others took account of tension, vision, and fields in their preoperative workup. Curran[69] divided his cases anatomically according to the size of the cornea, depth of the anterior chamber, and color of the iris. Barkan[74] types his cases according to the condition of the angle. Stein[17] separates his cases into private and clinic groups. Many, it will be noted, have made no attempt at preoperative classification or at least did not report them. As individual studies of the numerous separate phases of glaucoma surgery each is important, but their shortcomings for comparative evaluation are clear.

Gjessing[96] has been the most consistent protagonist of a careful preoperative and postoperative compilation of surgical material. The preoperative classification I have used in table 2 is based in great part on his groupings. With the minor changes I have suggested it is possible to tag each case of chronic glaucoma with a designation such as Simplex Class I-2-A or Congestive Class II-3-B which will immediately identify its important clinical features easily and simply.

Obviously this is not the whole story. The condition of the anterior chamber, iris, disc, and so forth, are all important and should be known. The preoperative condition of the angle has recently acquired special significance in relation to choice of operative procedure as shown by Troncoso,[97] Barkan,[74] Sugar,[98] and others. It may ultimately become apparent that knowledge of these factors is at least as important preoperatively as the status of the tension, vision, and fields. However, since the latter three are now our most common criteria of success in

glaucoma surgery they can at least be used as an initial basis for preoperative classification subject to later changes as dictated by experience.

3. A systematic evaluation of all the important operative procedures, old and new, in all the common types of glaucoma.

This presupposes a prearranged plan by which—under conditions as similar as possible—the various old standard procedures and promising new ones be employed in large series of equal numbers of cases representative of the various classes of glaucoma. In the larger institutions doing much glaucoma work the adoption of such a regime would be relatively simple. But this does not mean the restriction of this work to the larger institutions only. For with such a uniform program even small series of cases, such as is reported is tables 1 and 2, insignificant in themselves, can acquire cumulative importance. Grouped preoperatively as suggested above, cases can be followed clearly and their relative postoperative fate can be intelligently estimated as part of a uniform comprehensive program. In this way an approach can be made to the evaluation of the various surgical procedures carried out under average hospital and operative conditions.

4. A systematic follow-up for definite periods of time.

Even if all other factors are systematized there can be no conceivable comparative analysis of successful results unless similar cases, treated under the same conditions, are followed for equal lengths of time. With chronologic uniformity thus attained it may be possible to compile figures for 2-year, 5-year, and even 10-year cures for comparative study, as is done in other branches of surgery.

This also means the exertion of a greater concerted effort to follow cases postoperatively than has been shown heretofore. Lehrfeld and Reber[59] in staid old Philadelphia were able to find only 26.2 percent of 1,108 patients two to nine years after operation. Grosz's[29] 1,000 cases had dwindled to 300 at the end of five years. I was able to follow only 23 percent of 234 patients, postoperatively. Full and accurate postoperative observation of patients constitutes a major problem in itself. The requisitioning of help from social service departments to keep track of patients can be of great assistance. Continuous contact with the patient in postoperative clinics as far as possible and not a decision to compile statistics years after the patients have disappeared would also help to cut down the loss of statistical material.

5. The evaluation of results on the basis of generally adopted uniform criteria.

Standards for "success" vary markedly among reporters. The most common, appearing in the last column of table 3, is the regulation of tension. Griscom,[63] in presenting his statistics stated, "Since the object of all glaucoma operations is to effect a permanent reduction of tension, the writer has taken this as the standard by which the success or failure of the particular operation under discussion may be judged." Cross[99] feels that, "If you look after the pressure the fields will look after themselves." And Joseph[51] also states, "Ainsi le normalisation de la tension est tout au moins nécessaire, sinon suffisante, à l'obtenir d'un bon resultat visuel."

This, of course, is a limited, specialized definition of "success" in glaucoma surgery. For, as has been shown in tables 1 and 2, operative success in reduction of tension is by no means synonymous with success in preserving visual function. And Löhlein[100] found that, ". . . trotz der Normalisierung des Druckes ein weiterer, langsamer Funktionsverfall im

glaukomkranken Auge nicht selten statt findet. . . ." Gradle,[101] on the other hand, points out that, "The patient is not particularly interested in the degree of tension . . . or . . . in the visual field, but he is interested in what the visual acuity will be after operation; consequently *that* must be our estimate of the success of the operation." And Whitehead[13] has reported his results on the basis of visual acuity alone.

While Gradle's conclusions are undoubtedly true, the fact remains that whatever operative procedures we have in glaucoma are aimed directly at the reduction of intraocular pressure. Even when an eye with "normal" tension and deteriorating visual status is operated on, the presumption is that the tension is too high for that particular eye. It is a long time since von Graefe[102] said, "the only treatment from which relief can be expected is one that diminishes pressure," but we still have no operative procedure for the specific improvement of vision or fields. Hence, surgically, so long as our limited knowledge constrains us to treat glaucoma symptomatically and not etiologically, results—whether we like it or not—must be measured directly by the amount of tension reduction and only indirectly by the effect on vision and fields.

An appreciable number of reporters use both the direct and indirect results as criteria of success. Gjessing[60] goes a step further and insists that, "The true picture of the value of a glaucoma operation is merely obtained by taking the average value of the three above discussed factors (tension, vision, fields) in the eyes only, where all of them are either unchanged or even bettered after the operation." As in the case of a standard glaucoma nomenclature, it would seem that the final criteria adopted are less important than that they be used universally.

6. A special body of outstanding ophthalmologists to set up the codes and machinery necessary for the successful promulgation of such a plan.

The scope of such a body, whether national or international, will have to be limited by expediency and the condition of world affairs, but nothing will be accomplished without it. Time has already proved that without such a supervisory body the best intentions are useless.

Comment

It would be presumptuous to suggest that such a six-pointed program can be anything but tentative. Wiser heads, riper judgments, and actual experience will find much to amend, delete, and revise. The need for amplifications and simplifications will undoubtedly become apparent later. But some such schema is necessary if at least certain of the numerous controversial aspects of glaucoma surgery are to be settled.

Among questions requiring solution Wilmer[8] included: Which operative procedures can be performed by the ophthalmic surgeon of average experience with the greatest ease and safety? Which are the most likely to give permanent reduction in the intraocular pressure? To these may be added: Which procedure is best for the various classes of chronic glaucoma such as Simplex Class I-1-A or Congestive Class II-3-C, and the like? Which procedure is best calculated to preserve vision and fields? In which groups? Then there is the troubled question of postoperative infection still not definitely settled. In which class of cases does it occur most frequently? Is the trephining operation actually the worst offender? If so, is this true of all or only of certain classes of glaucoma? After almost 40 years of chronic glaucoma surgery and thousands of operations of which the above-reported results are only a fraction,

these questions and many others still remain to be definitely answered to the satisfaction of all.

It is not my intention to overestimate the value of such a program. Among many other things, final figures may prove—as many now believe—that the choice of procedure is less important than the skill of the surgeon, and that a good operator can get good results with several techniques that favorable cases are equally amenable to several forms of treatment; that there is no one technique paramountly suitable for any one class of chronic glaucoma; or, contrariwise, that it makes very little difference whether a filtration bleb is obtained by cutting, punching, or drilling.

The rather high percentage of published successful results herein reported may be confirmed and may prove that we are doing better than many suspected. Yet all this and other information, if definitely established, is also important and is needed. For in this way a step will have been taken away from the realm of speculation and presumption toward the attainment of some factual and statistical solidity. Even proof that some of the aforementioned questions are unanswerable would be valuable because it is more than we have now.

The glaucoma problem is a many-headed hydra requiring many forms of attack if the complete solution is ever to be found. Green,[103] Gradle,[104, 105] Schoenberg,[106, 107] and numerous others have discussed the various sociologic, educational, and organizational problems to be solved in order to reduce the incidence of blindness from glaucoma. These men have adequately pointed out that the causes of blindness from glaucoma are the inadequate publicity which the whole subject has received, the ignorance and carelessness of patients, the failure of optometrists and general practitioners to refer cases for prompt attention, and the inadequate organization of clinics for the diagnosis and care of patients. Gradle[88] has stated that 15 to 20 percent of all the blindness in the United States is due to glaucoma, and that fully 90 percent of it could have been prevented by early diagnosis and treatment. Not all men are so optimistic.

Green[103] says, "Do successful cases outnumber the unsuccessful or vice versa? It is hard for any individual ophthalmologist to answer this question. I cannot . . . share the conviction of a well-known American ophthalmologist . . . that all glaucomas sooner or later go blind provided the patient lives long enough. . . . I must confess, however, that whenever I operate on a chronic glaucoma I do so with many misgivings as to the ultimate result." And Butler[108] states that, "In correspondence with other ophthalmologists he was told that if he would take the trouble to follow up his cases of glaucoma he would find that practically all the patients after any form of operation ultimately went blind. That, however, was not true. He had simplex patients he had treated 15 or perhaps 20 years ago and blindness had not ensued. . . . Nevertheless he had been much saddened to see some of his supposed 'cures' come back as blind with glaucoma 10 or 20 years after any operation."

Be that as it may, and whatever the exact percentage of successful results, it is undoubtedly true that many eyes can be saved and their usefulness prolonged by operative procedure. And a proper evaluation of all glaucoma surgery might conceivably enable ophthalmologists to handle more efficiently and with greater benefit to the patient what is at present the biggest and most important problem in ophthalmology.

Summary and Conclusions

1. Results are reported in 54 cases of primary glaucoma followed from one-

half to six years after operation; over 60 percent were observed from two to six years. Reduction of tension to normal was obtained in 39 or 72.2 percent of the cases.

2. Of 31 cases of chronic congestive glaucoma, normal tension was obtained in 22 (70.9 percent), vision remained the same in 17 (54.8 percent), and fields were maintained in 13 (41.9 percent).

3. In 12 cases of chronic simple glaucoma normal tension was obtained in 9 (75 percent), vision remained the same or better in 7 (58.3 percent), and fields were maintained in 6 (50 percent).

4. In 11 cases of acute congestive glaucoma normal tension was obtained in 8 (72.7 percent).

5. A review of the published statistics for the past 15 years shows an over-all reported average of "success" in approximately 75 percent of cases following glaucoma surgery. This figure is almost identical with the results reported by Wilmer for the previous 15-year period.

6. The reported over-all average of successful results following the newer and combined operative procedures is 78.2 percent. This figure is less significant because of fewer cases reported and shorter follow-ups.

7. During the 15-year period ending in 1927, trephining was the most common operation used in glaucoma surgery, according to the reported statistics. Cyclodialysis and then anterior sclerectomy were next in popularity.

8. During the following 15 years reports show that trephining still is the most popular choice with the iris-inclusion technique the second most common choice.

9. On the basis of published figures the iris-inclusion technique has given the best results during the past 30 years.

10. On the whole, better results appear to have been obtained in the chronic congestive than in the chronic simple glaucomas.

11. The figures also seem to show that iridectomy is used about as frequently in the chronic as in the acute glaucomas, with poorer results in the former.

12. Ophthalmology has made poor statistical use of its human operative material. Because of lack of uniformity, published results of glaucoma surgery are of little help in gauging the value of the various procedures and in the solution of the many existing surgical problems in glaucoma.

13. A program to facilitate the evaluation of published results of glaucoma surgery is suggested.

14. A simple method for the preoperative clinical classification of chronic glaucoma is suggested.

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EPIDEMIC KERATOCONJUNCTIVITIS*

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In 1939 zur Nedden[1] reported 200 cases of a rapidly spreading form of acute conjunctivitis associated with corneal lesions which occurred in Düsseldorf. The same year Schneider[2] published an account of 150 cases of this disease which he had seen in Munich. Two years later an epidemic occurred in Oahu, Hawaii, and was reported by Holmes.[3] Accounts of similar epidemics have come from India and from Tasmania. An epidemic of this condition has also occurred on our own west coast in the fall of 1941, and descriptions of these cases have recently been published in the medical literature.

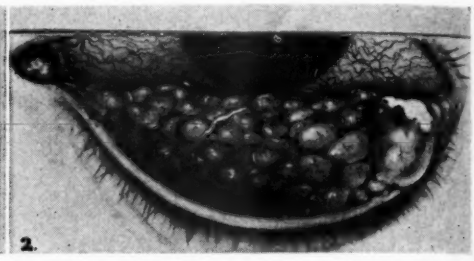

Fig. 1 (Berliner). Early stage of follicular formation.
Fig. 2 (Berliner). Folliculosis and exudation. Later stage.

The German writers emphasized the epidemic nature of the condition, the severe conjunctivitis, the corneal lesions, which often could be seen only with the biomicroscope, and the presence of adenopathy. They called the condition keratoconjunctivitis epidemica.

Epidemic keratoconjunctivitis is characterized by sudden onset with pain, like that caused by a foreign body in the eye, excessive lacrimation, and marked edema. On the second or third day swelling of the preauricular node occurs; this may or may not be painful and generally subsides within a week. Although in the first few days secretion is minimal, later it may become profuse and actual membranes, dirty gray in appearance, may form. Removal of these membranes may leave raw bleeding points. In about half the cases the fellow eye becomes involved after the first week.

As a rule the acute symptoms begin to abate at the end of the second or the beginning of the third week. The swelling and secretion diminish, leaving a thickened and reddened mucosa that persists, owing to residual folliculosis. This may

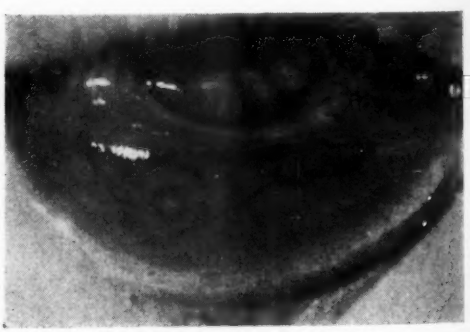

Fig. 3 (Berliner). Acute stage showing chemotic conjunctiva covered by membranous exudate stained with argyrol.

* Read before the New York Society for Clinical Ophthalmology, May 4, 1942.

continue for from four to eight weeks before complete resolution occurs. About the time the acute symptoms subside more than half the patients complain of blurring of vision. This results from the presence of small discrete grayish infiltrates that occupy the pupillary area and are located in the basal layer of the epithelial cells or in Bowman's zone. At no time is there any visible reaction in the anterior chamber.

Beginning late in December, 1941, I had occasion to see about 18 persons having this type of conjunctivitis. In 9 instances the infection spread to the opposite eye, and in 14 corneal opacities appeared, reducing the vision on an average to about 20/50. As time went on the vision gradually improved, and in most instances after three months from the time of onset the spots became less opaque; in 10 cases the vision improved

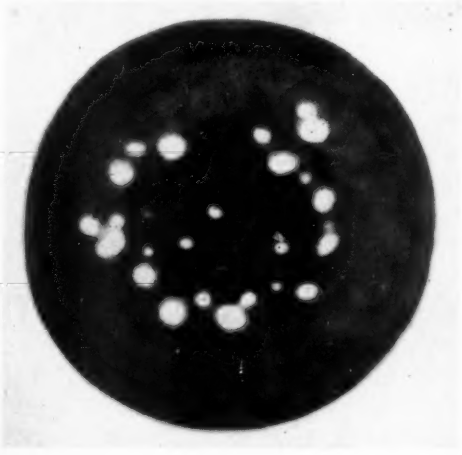

Fig. 4 (Berliner). Indirect illumination. Biomicroscopic view of corneal lesions in a severe case.

to 20/30 or to 20/20−. In four cases the spots were very small and no evidence of their presence could be seen after three months. In three cases the corneal spots were seen on the third day following the onset of the conjunctival congestion. In one case these lesions assumed polymorphous forms rather than the usual circular shape, appearing as short, irregular lines.

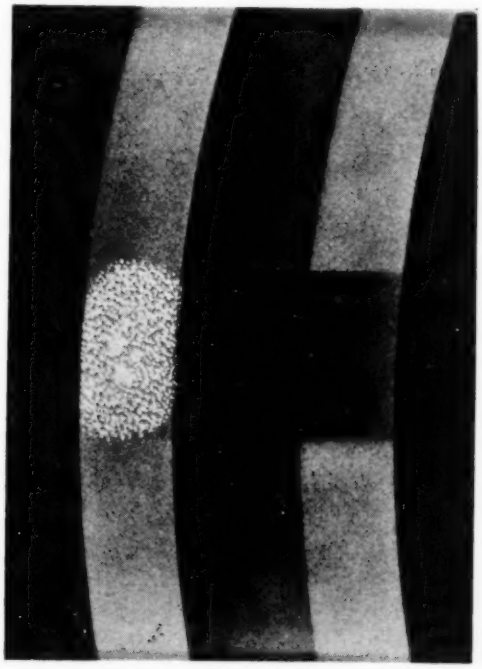

Fig. 5 (Berliner). Direct focal illumination. Biomicroscopic appearance of a corneal lesion under high power. 40×.

By retroillumination the corneal surface resembled that seen in mild keratoconjunctivitis sicca, although no filaments were present. In the early stages the corneal lesions can be stained with fluorescein; then they frequently have a pyriform shape, the tapering greenish stained ends coming to the surface of the tear-film line. Later the connections with the surface epithelium become lost and after two or three weeks they are found in the deepest (basal) epithelial layer as circular and granular lesions. At times they appear to lie between the epithelium and Bowman's zone. In this later stage several unsuccessful attempts were made to stain them by repeated instillations of fluorescein over a period of 20 minutes.

Biomicroscopic examination of the palpebral conjunctiva during the height of the acute stage revealed rows of closely packed hemispheric follicles interspersed with occasional papillary formations. At times, marked chemosis masked the presence of follicles. This was particularly marked in the lower lid and cul-de-sac. The bulbar conjunctiva was injected and chemotic. In the subacute stage the follicles gradually diminished in size but did not completely disappear until at least two months after their initial appearance. Likewise, the small discrete corneal opacities, which were made up of fine whitish granular dots, became grayer and thinner as time went on, and in four instances they could no longer be seen after three months.

It would seem from the host of conjunctival conditions in which punctuate corneal infiltrates occur that these lesions are not specific for any particular condition. In contrast to other tissues the natural transparency of the cornea permits the observation of their formation and resolution. They are probably intracellular or extracellular coagula or precipitates caused by trophic disturbances. Such punctate changes are commonly seen following burns with acids or alkalies, traumatic injuries, bacterial and viral infections, and in allergic conditions. As is the case with corneal infiltrates generally, the tendency toward absorption and clearing is more marked if the precipitates are small and not too closely packed. However, when they are large, or closely packed, it is usual to find that they fail to clear entirely.

Although this condition bears similarity to Béal's type of conjunctivitis it differs in that it is much more severe and has corneal complications.

In a personal communication Dr. Swick of this city informs me that he has recently seen 22 cases, 12 of which showed the typical corneal changes. In six of the latter the vision at the present time is reduced to 20/40 and in the remaining six the vision has improved to 20/20–.

Bacteriologic studies by separate workers have uniformly proved negative. The general feeling is that the condition is due to a virus infection. In a report from Dr. Thygeson, he says, "The cases which we have seen, including the one you sent up, have shown negative bacteriologic findings, but all have shown a mononuclear-cell exudate. Two of the cases have suggestive basophilic inclusions in the cytoplasm of epithelial cells, but this finding has not been consistent enough to be significant. There has been no transmission to any of the ordinary laboratory animals, but there have been a few apparently successful transmissions intracerebrally in mice producing meningoencephalitis, but it has not been possible to maintain any of these in series. Dr. Sanders is now attempting to obtain a strain which can be maintained in mouse and tissue culture, but has not as yet been successful. I feel that the results, though negative, definitely suggest a virus etiology."

Therapy usually employed for conjunctivitis has proved of little benefit in these cases. Silver nitrate and copper increased the discomfort of the patients and produced a more profuse exudate. The silver proteins had no apparent effect. Sulfathiazole and sulfadiazine, administered both locally and by mouth, were likewise of no value. The only measures I have found, which at least give some relief to the patient, are local irrigations with a weak solution of sodium bicarbonate and application of cold compresses. After the acute symptoms have subsided, dionin has been used in treating the opacities.

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VARICELLA AND THE CORNEA*

A CASE REPORT

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It is indeed unusual for a condition as commonly known as chicken pox to have so few ocular lesions associated with it; at least the reports in the literature and textbooks are relatively meager. An attempted explanation for this will be given later in this paper. However, the eye disorders reported as complicating varicella range from bilateral papilledema associated with encephalitis (Mayerhofer and Breitenfeld[1]) to ophthalmoplegia extrinsica (Marfan[2]).

One of the most common lesions seen with this acute exanthema is a phlyctenular, or vesicular type of conjunctivitis. Such a case has been noted by Hilbert,[2] who described inflammatory changes in the bulbar conjunctiva of a six-month-old infant affected with varicella.

Trantas[2] reported a case of mild conjunctivitis with chicken pox, associated with a bilateral superficial keratitis.

Roger[2] observed a mild case of conjunctivital eruption.

Löwenstein[3] long ago reported a condition of the iris which he called "vitiligo iridis," seen following herpetic infections. He mentioned this depigmentation as following inflammatory changes and hemorrhages occurring with herpes zoster and smallpox; he was also able to induce this depigmentation in rabbits by inoculating the virus of herpes febriles into the anterior chamber. Knowing the close biologic relationship of the viruses and chicken pox, he expected a similar picture in varicella. This was found and reported as a case in which there was also a corneal opacity.

Accardi,[2] who reviewed the literature thoroughly, concluded that lesions of the iris seen with variola, as reported by Müller, Löwenstein, Carmi, and Alajmo, were also sometimes evident with varicella. His case was that of an eight-year-old girl who had had chickenpox and exhibited in the iris stroma, round spots, pearly in color, and devoid of pigment. However, he preferred the name "post-varicellar" leucoridia to that given by Löwenstein.

Chow[4] reported two cases of chicken pox of the cornea, but both were in relation to a conjunctivitis; these took the form of phlyctenularlike lesions at the limbus and seemed to heal rapidly, leaving no permanent damage. In contrast to corneal lesions seen with smallpox, in which the prognosis is very unfavorable, the lesions of chicken pox usually heal without scar formation.

Pickard[5] mentioned the rarity of corneal affections in varicella and reported a case in a 10-year-old boy. There were evidently no conjunctival lesions present,

*From the Eye, Ear, Nose, and Throat Service, Station Hospital.

though the membrane was slightly pink. The cornea presented a picture involving its entire thickness, with swelling of the posterior portions; there was also a brown exudate on the endothelial surface confined to the site of the inflamed cornea. However, despite the relatively marked

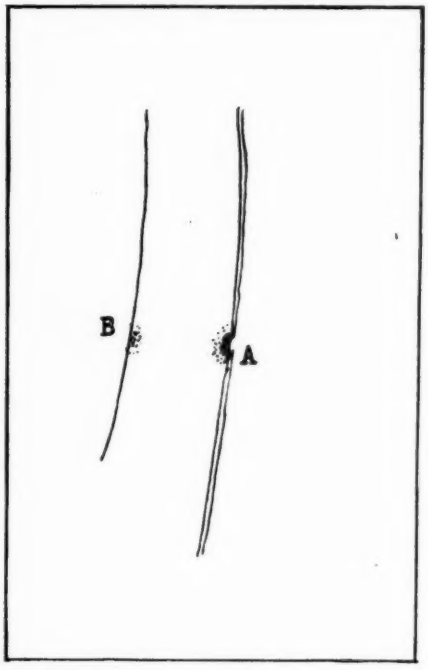

Fig. 1 (Rosenbaum). Sketch showing infiltration on anterior surface of cornea (A), and on the posterior surface (B).

infiltration, the eye healed completely and retained normal vision.

Oppenheimer's[6] case, which was one of the first to be reported, differed from the preceding one in that it started as a simple corneal bleb which ruptured and left a superficial ulcer. This healed promptly and left no visible defect.

However, Post[7] had a case which left a marked corneal scar with much impairment of vision.

There was no mention made in any of the aforementioned reports of the presence of either "Paul's excrescences" or "Guarnieri bodies."[8] It is possible that inoculation of the rabbit's cornea with the varicella virus would produce intracellular inclusions similar to those found after vaccinia or herpes-virus injection.

Case report: Captain H. K. W., a student at the Command and General Staff School, Fort Leavenworth, Kansas, was first seen in the Eye Clinic on January 24, 1942 His chief complaint was "dimness of vision" of the right eye for two days, and some redness of the right eye. His history was as follows: On January 6, 1942, he began having aching pains in his back, arms, and legs, together with a feeling of general malaise. These symptoms, in view of the prevalence of upper-respiratory infections at that time, made the patient feel as though he had the "flu." Two small pimples on the skin over the right collar bone were noted by the patient, but little attention was paid to them. He continued with his work despite the continuance of the general aching and malaise and the feeling of some fever at night. On January 9th, there was a slight breaking out on his face, which looked to him like "hives"; he reported to the Out-Patient Clinic where a diagnosis of chicken pox was made. From January 6th to 16th, the symptoms of general discomfort continued, and he was literally covered with typical varicellar lesions from head to hips; the scalp was markedly affected. There was a particularly heavy group of vesicles just over the right cheek, and a few on the right eyebrow. He had no trouble with his eyes, except for an occasional sharp pain in his right eye. The pain appeared and disappeared with extreme suddenness. No redness nor tearing was evident at that time.

The lesions persisted for about seven days, then a gradual process of resorption started. On January 22d, while washing his face, he felt a sudden sharp pain in the right eye; there was considerable tearing and photophobia, and the discom-

fort lasted approximately three hours. Following this, there was a constant feeling of irritation, as though a "foreign body were in the eye"; there was no excessive tearing, and only a mild redness. However the vision in the right eye was noticeably blurred and caused the patient to consult the ophthalmologist.

Previous eye history and past general history were entirely negative.

Examination: Vision, right eye was 20/40−3; left eye, 20/20. The lids and lacrimal apparatus were entirely normal; the external ocular movements full in all directions. Ocular tension of both eyes was normal to finger palpation. The pupil of the right eye measured approximately 3 mm. in diameter, of the left about 4 mm.—both reacted promptly to light and accommodation. The conjunctivas were clear, and no lesions nor scars were seen. There was a mild redness of the palpebral portion of the upper and lower lids, and a very slight amount of pericorneal injection of the right eye. Situated in almost the exact center of the cornea of the right eye was a small, perfectly rounded stippled haziness, measuring about 1.5 mm. in diameter. When examined with the slitlamp, a small, shallow, excavated area was seen, surrounded by a ring of slight infiltration and edema. The borders of the denuded area were very slightly raised, and overhanging the edges were what appeared to be epithelial filaments, such as are evident after the rupture of a vesicle. The ulcerated area stained very faintly with 2-percent fluorescein. The surrounding infiltration extended only a slight distance into the corneal depth; however, on the posterior surface, there were visible some infiltrations into Descemet's membrane and into the endothelium. The corneal tissue between these infiltrations appeared perfectly normal. In the aqueous humor no free cells were seen, nor any dilatation of vessels on the anterior surface of the iris. There was some degree of anesthesia of the cornea of the right eye as compared to that in the essentially normal left eye.

On the right cheek, just below the inferior orbital margin, were three rounded, reddened, slightly umbilicated scars; there was a similar scar in the right brow.

The treatment outlined was the use of 1-percent ethyl morphine hydrochloride three times each day, followed by hot, wet compresses for 20 minutes. There was a steady resorption of the infiltration and edema, and by February 5th the vision of the right eye was 20/30, and only a faint grayish area remained. The infiltration on the posterior surface disappeared completely within 10 days, and that anteriorly was also rapidly disappearing when the officer was transferred from this School, on about February 11, 1942. However, Dr. E. P. Norwood of Corsicana, Texas, was kind enough to send me a report of his examination on March 2, 1942. Vision had improved to 20/20−2, and only a faint leucoma was visible over the pupillary area. The pupils were equal and reacted promptly to light and accommodation.

The history of this case in addition to the typical herpetic appearance, without any demonstrable conjunctival defect, warranted the diagnosis of corneal lesion associated with chicken pox. From the appearance alone it could very well have been a herpes of the cornea, and, since the location of the skin lesions was decidedly pronounced in the areas of distribusion of the 1st and 2d divisions of the fifth nerve, some herpetic relationship was undoubtedly present. This has been mentioned by Löwenstein and Pickard, as well as others.

The relatively minor symptoms together with the resultant mild ocular disturbance might account for the supposed "infrequency" of primary varicellar cor-

neal lesions. Since most chicken pox is in children and their power of observation is less than that in adults, it is easily possible that many cases of this type can heal in the absence of ocular examination, either by the ophthalmologist or the pediatrician.

The case reported here is almost identical with that of Oppenheimer;[6] it also closely resembles the condition in Pickard's[5] patients. In all three of these, the lesion presented itself late in the disease, occurring on the sixth day in Oppenheimer's, on the twenty-first day in Pickard's, and on the sixteenth day in this case; the lesions were relatively small and well circumscribed, caused little or no iridic reaction, and all healed rapidly and completely.

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PROSTIGMINE IN THE TREATMENT OF GLAUCOMA: ITS EFFECT ON INTRAOCULAR PRESSURE*

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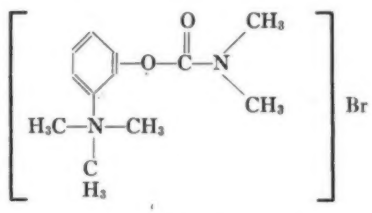
From the standpoint of incidence and distress to the patient, glaucoma occupies a position of unquestioned preëminence amongst the various problems confronting the ophthalmologist. The importance of the problem is amply attested to by the voluminous reports on various phases of the subject that have appeared in the literature. Nevertheless, despite the earnest efforts of many workers, much remains to be done toward the elucidation of the etiologic factors and mechanisms involved and the establishment of the basic principles of therapeutic and surgical management.

Fundamentally, there are two prinicipal schools of thought on the subject of the management of glaucoma; namely, the medical and the surgical. Present-day usage has tended toward a judicious combination of these two basic methods so that in common practice medical measures are first instituted and are abandoned for the operative procedures only after unmistakable evidence of failure is manifest. That this chronology has been largely dictated by the patient's deep-rooted fear of surgical intervention, does not detract from the wisdom of the procedure. This is evident in the fact that operative measures are not infrequently unsuccessful. According to Parker:[1] "The average results from surgical treatment for simple glaucoma, if all stages of the disease are included, might be stated as follows: 60 percent of the patients operated on will have the tension satisfactorily reduced and the integrity of the globe maintained; in 30 percent the condition will be uninfluenced by the operation; and 10 percent may be made worse by the operative procedure."

In view of the foregoing, the ophthalmologist is constantly on the alert for any innovation, be it medical or surgical, that gives promise of making some definite contribution to his armamentarium.

Several reports have lately appeared in the literature concerning a relatively new method of treatment involving the use of prostigmine. This drug was first synthesized by Aeschlimann and Reinert[2] during the course of their researches to obtain a substance that would be similar to the alkaloid physostigmine in pharmacologic action, without manifesting the high degree of toxicity that accompanies the use of the latter. Chemically, prostigmine, or, more specifically, prostigmine bromide, is the dimethyl-carbamic ester of meta-hydroxy-phenyl-trimethyl-ammonium bromide and has the following structural formula:



In common with its chemical progenitor, physostigmine or eserine, and other parasympatheticomimetic drugs, prostigmine exerts a powerful miotic effect when instilled into the conjunctival sac. This property was first demonstrated in 1935 by Rossi[3] in his experimental studies on animals and humans. He also showed—as is the case with eserine—that a lowering of the intraocular pressure accom-

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panied the miosis produced by prostigmine. Two years later, Myerson and Thau[4] presented the results of their pharmacologic studies on the effect of acetyl-beta-methyl-choline chloride alone and in combination with prostigmine. Subsequently, in a clinical report, Clarke[5] pointed out the advantages obtaining from the use of the relatively nontoxic prostigmine, both alone and as a synergist of acetyl-beta-methyl-choline chloride. It is interesting to note, however, that neither report made mention of Rossi's work. More recently further mention of its use in the treatment of glaucoma has been made by Gifford,[6] Johnson,[7] and Terry.[8] The clinical results obtained by Terry, in particular, tend to confirm Clarke's findings.

As is the case with all the other substances used by the ophthalmologist to control tension in the glaucomatous eye, the actual physiologic mechanism whereby prostigmine effects a lowering of the intraocular pressure is at present not completely understood. In this regard, several theories have been postulated. The one most generally accepted is predicated upon the belief that the miotic action of the drug serves to free the angle of the anterior chamber and thus facilitate the passage of the aqueous through the canal of Schlemm. Another possibility exists in the vasodilatory action of prostigmine. This action was recently demonstrated—in so far as the general peripheral circulation is concerned—by Perlow,[9] who subsequently[10] used prostigmine in the treatment of peripheral vascular disease, with favorable results. Proponents of the vasodilatation theory maintain that increased circulation in the eye is capable of effecting the removal of some of the intraocular fluid. Still others postulate that the effect of prostigmine, rather than being direct, is mediated through the acetylcholine reserves of the body by the ability of the drug to inhibit the hydrolytic action of acetylcholine esterase. According to this theory, therefore, the desired cholinergic effect with its consequent miosis, vasodilatation, and stimulation of the parasympathetic effector cells, is achieved by the mobilization of the acetylcholine already present in the body. Since each of these theories, at least in part, has been substantiated by experimental findings, in all probability each of them is a factor in the actual mechanism involved in the lowering of the ocular tension.

The present study was carried out at the Department of Ophthalmology of the Manhattan Eye, Ear, and Throat Hospital in a series of 28 cases of glaucoma, in an effort to evaluate the efficacy of prostigmine bromide in the treatment of that disease. Due to the relatively short time during which the patients had been under observation prior to the preparation of this paper, this report concerns itself entirely with the effect of the drug on the ocular tension. A further report is contemplated relative to its effect on visual fields and visual acuity.

The patients treated fall into three principal categories; namely, (a) chronic primary glaucoma, (b) glaucoma secondary to quiescent anterior uveitis, and (c) absolute glaucoma. Within the limits of these principal categories, the patients were selected on the following bases: (1) those who had received no previous medication; (2) those in whom tension was being controlled through the use of other miotics—for purposes of comparison; (3) those in whom the tension was not being controlled through the use of other miotics.

Initially, all patients were treated with the 5-percent solution of prostigmine bromide by instillation—the factor of frequency of medication being subjected to the variations demanded by individual requirements. In those cases in which the

5-percent solution successfully controlled the tension for a period of several days the strength of the solution was reduced to 2½ percent. A fair proportion of the patients did well on the lower dosage.

All measurements were made by the author to eliminate, in so far as possible, errors of precision.

The new Schiötz tonometer was used exclusively. For the purposes of this study, 30 mm. Hg was taken as the upper limit of normal intraocular pressure. Eyes were considered as controlled when the tonometric tensions did not exceed that figure throughout the period of observation. Those in which a higher tension was recorded at any time were classed as uncontrolled.

The pertinent data, including statistics on the selected groups (p. 58) and 28 individual case reports, are presented in the following tables.

TABLE 1

ALL EYES

Type	Total No. of Eyes	Controlled by Prostigmine		Uncontrolled by Prostigmine	
		No. of Eyes	Percent	No. of Eyes	Percent
Primary	41	25	61	16	39
Secondary	9	3	33	6	67
Absolute	2	1	50	1	50
Total	52	29	56	23	44

TABLE 2

EYES UNTREATED PRIOR TO PROSTIGMINE THERAPY

Type	Total No. of Eyes	Controlled by Prostigmine		Uncontrolled by Prostigmine	
		No. of Eyes	Percent	No. of Eyes	Percent
Primary	23	18	78	5	22

TABLE 3

EFFECT OF PROSTIGMINE ON EYES CONTROLLED BY PILOCARPINE OR ESERINE

Type	Total No. of Eyes	Remained Controlled by Prostigmine		Uncontrolled by Prostigmine	
		No. of Eyes	Percent	No. of Eyes	Percent
Primary	6	4	67	2	33

TABLE 4

EFFECT OF PROSTIGMINE ON EYES UNCONTROLLED BY PILOCARPINE OR ESERINE

Type	Total No. of Eyes	Controlled by Prostigmine		Remained Uncontrolled by Prostigmine	
		No. of Eyes	Percent	No. of Eyes	Percent
Primary	12	3	25	9	75
Secondary	7	2	29	5	71
Absolute	1	0	0	1	100
Total	20	5	25	15	75

TABLE 5

INDIVIDUAL CASE REPORTS

Case Age	Diagnosis	Previous Drug Used	Corrected Vision	Tension Before Prostigmine	Prostigmine Strength and Doses	Period of Prostig. Therapy	Tension with Prostig. After	Highest and Lowest During Period	Patient's Remarks	Remarks
No. 1 J.R. M.W. 65	Prim. chron. gl. OU	Pilo. 1% OD Eser. ½% OS	OD = 20/30 OS = L. Perc.	OD = 29 OS = 35	5% OD = 3 × d OS = 5 × d	April 1940 to date*	OD = 25 \ 7 OS = 40 / days	OD = 26–24 OS = 55–35	Slight burning first two days. Vision not so blurred as with pilo. and eserine	On May 7 Prostig. 2½% being used. Tension controlled in OD
No. 2 B.M. F.W. 59	Prim. chron. gl. OU Corneoscleral trephining OU	Eser. ½% with Dionine ½% 4 × d	OD = H.M. OS = 20/40–1	OD = 38 OS = 26	5% OU = 5 × d	April 6 1940 to date*	OD = 28 \ 3 OS = 24 / days	OD = 30–23 OS = 26–21	None	This was an unsuccessful trephining. Since Aug. 2/40 under 2½% Prostig. with tension controlled
No. 3 J.C. M.W. 49	Prim. chron. gl. OU	Eser. ½% q. 2h	OD = 20/40 OS = Fingers	OD = 30 OS = 34	5% 4 × d	1½ months	OD = 20 \ 3 OS = 24 / days	OD = 52–20 OS = 40–24	Vision less blurred than with eserine	Prostigmine held tension until May 10th, when surgery was done in view of tension
No. 4 R.N. M.W. 60	Prim. chron. gl. OU	None	OD = 20/50–2 OS = 20/50	OD = 48 OS = 48	5% q. 2h	2 days	OD = 42 \ 24 OS = 18 / hours	OD = 42 OS = 18	None	Changed from prostig. to eserine 1% q. 2h and tension became 26 in both eyes. Surgery advised and refused
No. 5 F.M. M.C. 52	Sec. glauc. to old uveitis OU Lagrange OD Iridencleisis OD	Pilo. 1% q.i.d.	OD = 20/100 OS = L.P.	OD = 65 OS = 50	5% q. 2h	June 14 1940 to date*	OD = 19 OS = 48 24 hours	OD = 29–19 OS = 50–42	None	Tension remained under 30 with prost. and massage in OD
No. 6 F.L.C. F.W. 58	Prim. chron. gl. OD Absolute OS Trephine OS	Eser. ½% q. 3h	OD = 20/40 OS = No L.P.	OD = 29 OS = 26	5% q. 4h	5 days	OD = 27 \ 3 OS = 28 / days	OD = 27–28 OS = 28–30	Complains of considerable burning from prostigmine, even with 2% solution	Prostig. discontinued because of patient's complaints
No. 7 J.O. M.W. 57	Prim. chron. gl. OU	Eser. ½% q. 2h	OD = 20/100 OS = 20/70	OU = 76	5% q. 1h	1 day	OD = 65 \ 8 OS = 76 / hours	Same	None	Surgery performed in view of tension
No. 8 J.P. F.W. 49	Prim. chron. gl. OU	Pilo. 1% q. 4h	OD = 20/40 OS = 20/70	OD = 26 OS = 41	5% q. 3h	4 days	OD = 26 \ 2½ OS = 38 / hours	Same	None	Surgery performed
No. 9 A.D.O. F.C. 49	Sec. glauc. OD Operative aphakia OD (Gl. consecutive to op.)	Eser. ½% OD	OD = 20/70 OS = 20/100	OD = 48 OS = 26	5% OD q. 3h	5 days	OD = 48 24 hours	OD = 48–48	None	Cyclodialysis done May 5/40 to control tension
No. 10 M.C. F.W. 53	Prim. chron. gl. OU	None	OD = 20/40 OS = 20/50	OD = 36 OS = 40	5% OU = 4 × d	June 26 1940 to date*	OD = 27 OS = 25 2½ hours	OD = 29–22 OS = 27–21	Slight burning first 24 hrs. with the 5% sol. No complaints with 2½%	Put on 2½% sol. after 3 days with tension remaining below 29
No. 11 P.S. M.W. 39	Sec. glauc. OU (quiescent uveitis OU)	Eser. 1% Pilo. 1%	OD = 20/70 OS = 20/50	OD = 38 OS = 35	5% OU = 4 × d	Aug. 3 1940 to date*	OD = 30 OS = 28 2 days	OD = 35–28 OS = 29–27	Slight burning for first 2 days	5% sol. keeps OS tension around 28–30. 2½% sol. ineffective
No. 12 L.G. M.W. 41	Sec. glauc. OS Old uveitis, quiet. Glaucoma [illegible]	Pilo. 1%	OD = 20/20 OS = 20/100	OD = 24 OS = 38	5% OS = 5 × d	7 days	OD = 32 OS = 32 2 days	OS = 38–30	None	Trephining OS done July 16/40 to control tension
M.P. F.W. 62		None	OS = 20/30	OD = 32 OS = 32	5% 4 × d	May 15 1940 to date*	OD = 26 OS = 28 2 days	OD = 28–22 OS = 29–21	None	Tension remains below 30 with 2½% sol. 4 × d

No. 11 P.S. M.W. 39	Sec. glauc. OU (quiescent uveitis OU)	Eser. 1% Pilo. 1%	OD = 20/70 OS = 20/50	OD = 38 OS = 35	5% OU = 4 ×d	Aug. 3 1940 to date*	OD = 28 OS = 28 2 days	OD = 29–27 OS = 38–30	None for first 2 days	2½% sol. ineffective Trephining OS done July 16/40 to control tension
No. 12 [illegible] M.P. F.W. 62	Sec. glauc. OS Old uveitis, quiet, [illegible]	Pilo. 1%	OD = 20/20 OS = 20/100 OD = 20/30 OS = 20/30	OD = 24 OS = 38 OD = 35 OS = 32	5% OS = 5 ×d 5% 4 ×d	7 days May 15 1940 to date*	OS = 32 2 days OD = 26 OS = 28 2 days	OD = 28–22 OS = 29–21	None	Tension remains below 30 with 2½% sol. 4 ×d
No. 14 M.T.W. M.W. 70	Prim. chron. gl. OU Trephining OD	Eser. ¼% Pilo. 1%	OD = 20/200 OS = 20/40	OD = 35 OS = 40	5% 4 ×d	June 1 1940 to date*	OD = 30 OS = 28 2 days	OD = 34–28 OS = 30–26	Slight chemosis of conjunctiva OD first 3 days	Requires 5% sol. to keep tension around 30. OD below OS
No. 15 J.B. M.W. 64	Prim. chron. gl. OD Absolute gl. OS	Eser. ¼%	OD = 20/70 OS = No. L.P.	OD = 40 OS = 48	5% 4 ×d	13 days	OD = 38 OS = 45 24 hrs.	OD = 40–35 OS = 46–45	None	Iridencleisis done in OD to control tension
No. 16 M.C. F.W. 58	Prim. chron. gl. OU	None	OD = 20/50 OS = 20/30	OD = 40 OS = 38	5% 4 ×d	Aug. 26 1940 to date*	OD = 28 OS = 26 2 days	OD = 30–24 OS = 28–22	Slight burning first 3 days	5% sol. keeps tension under normal
No. 17 T.Y. F.C. 44	Prim. chron. gl. OU	None	OD = 20/70 OS = 20/40	OD = 38 OS = 32	5% 4 ×d	July 29 1940 to date*	OD = 28 OS = 24 2 days	OD = 28–24 OS = 28–21	None	Tension controlled with 5% sol. t.i.d.
No. 18 J.Z. M.W. 57	Prim. chron. gl. OU	None	OD = 20/50 OS = 20/50	OD = 40 OS = 45	5% 4 ×d	May 17 1940 to date*	OD = 32 OS = 28 2 days	OD = 35–28 OS = 30–22	None	Trephining OD done to control tension. Tension OS kept below 30. with 5% 4 ×d
No. 19 D.W. F.W. 61	Prim. chron. gl. OU	None	OD = 20/100 OS = 20–200	OD = 65 OS = 70	5% q. 2h	2 days	OD = 35 OS = 32 15 hrs.	OD = 38–34 OS = 40–32	Slight conjunctival chemosis	Trephining done in both eyes, after eser. and pilo. failed, also to control tension
No. 20 J.P. M.C. 48	Sec. glauc. OS Old quiet iritis with post. synechia OS	Eser. ¼% Pilo. 1%	OD = 20/20 OS = 20/200	OD = 22 OS = 42	5% 4 ×d to left eye	4 days	OS = 40 2½ hrs.	OS = 42–38	None	Trephining done in OS June 8/40 to control tension.
No. 21 M.Ch. M.W. 59	Prim. chron. gl. OU	None	OD = 20/40 OS = 20/100	OD = 35 OS = 36	5% 4 ×d	May 18 1940 to date*	OD = 26 OS = 25 2 days	OD = 28–22 OS = 29–21	None	Tension remains under 30 with 2½% sol. 4 ×d
No. 22 T.G. M.W. 64	Prim. chron. gl. OU	None	OD = 20/30 OS = 20/40	OD = 35 OS = 30	5% 4 ×d	June 2 1940 to date*	OD = 28 OS = 24 2 days	OD = 28–24 OS = 25–21	Complains of burning after drops	Tension remains under 30 with 5% sol. 4 ×d
No. 23 C.F. F.C. 60	Prim. chron. gl. OD Operative anophthalmus OS	None	OD = 20/100	OD = 40	5% 4 ×d	May 30 1940 to date*	OD = 28 24 hrs.	OD = 30–24	None	Only 5% keeps tension within normal limits. This case is important because of surgical risk for a one-eyed pt.
No. 24 H.M. F.W. 47	Secondary gl. OU Trephine OD	None	OD = 20/70 OS = No. L.P.	OD = 35 OS = 40	5% 4 ×d	June 22 1940 to date*	OD = 28 OS = 36 2 days	OD = 30–26 OS = 40–34	None	Tension in OD controlled with 5%
No. 25 M.S. M.W. 51	Prim. chron. gl. OU	Eser. ¼% Pilo. 1%	OD = 20/50 OS = 20/40	OD = 36 OS = 32	5% 4 ×d	Aug. 2 1940 to date*	OD = 26 OS = 28 3 days	OD = 30–25 OS = 32–24	Vision not so blurred as with eser.	With 5% sol. OD tension remains below 30
No. 26 T.R.K. M.W. 55	Prim. chron. gl. OU	None	OD = 20/70 OS = 20/40	OD = 56 OS = 40	5% 4 ×d	July 9 1940 to date*	OD = 45 OS = 29 3 days	OD = 48–38 OS = 30–26	Slight burning	Trephining done on OD July 20th. Left eye tension still controlled with 5% sol.
No. 27 F.R. F.W. 58	Prim. chron. gl. OU	None	OD = 20/40 OS = 20/100	OD = 35 OS = 38	5% 4 ×d	June 1 1940 to date*	OD = 21 OS = 28 2 days	OD = 28–19 OS = 29–22	Slight burning	Tension remained under control with 5% sol. 4 ×d
No. 28 M.C. M.W. 63	Prim. chron. gl. OU Trephine OD Trephine OS	Eser. ¼% 4 ×d	OD = 20/100 OS = 20/70	OD = 32 OS = 28	5% 4 ×d	6 days	OD = 35 OS = 30 2 days	OD = 26–32 OS = 32–28	None	Pt. put back on eser. for 3 days, after which a second trephining was done in each eye to control tension

* Treatment in progress at time of this report, April 19, 1941.

Summary

The action of prostigmine bromide has been studied in a series of 28 cases of glaucoma comprising a total of 52 glaucomatous eyes, of which 41 were primary, 9 were secondary, and 2 were absolute glaucomas. It has been found that in 56 percent of all the eyes treated the tension was controlled by prostigmine therapy. As might well have been expected, primary glaucoma responded most satisfactorily and absolute glaucoma least satisfactorily to conjunctival instillations of the drug.

The best results were obtained in cases of primary glaucoma in which no previous medication had been administered. In 78 percent of the eyes treated in this group of cases prostigmine therapy successfully controlled the tension. This is in substantial agreement with published reports from other observers.

Of the primary glaucomas already controlled by pilocarpine or eserine, prostigmine failed to maintain the tension within normal limits in 33 percent of the eyes in this group. While the number of eyes is too small to let us arrive at a final conclusion, the figures given indicate that pilocarpine or eserine possesses a stronger hypotensive action than does prostigmine bromide. On the other hand, of 20 eyes not controlled by pilocarpine or eserine, prostigmine successfully reduced the tension to normal levels in 5 eyes, or 25 percent of the eyes in this group.

Although Clarke[5] reported a rather rapid reduction of pressure in his cases, the author could not verify Clarke's findings due to the technical difficulties inherent in working with clinic patients.

Conclusion

1. Prostigmine has proved to be a valuable addition to the armamentarium of the ophthalmologist in the treatment of glaucoma—notably in the chronic primary type.

2. In an appreciable percentage of cases initially controlled with the 5-percent solution of prostigmine bromide, it has been found that the 2½-percent solution can be satisfactorily substituted. It is recommended that this procedure be adopted whenever possible in the interests of comfort and economy.

3. Subjectively, prostigmine seems to interfere less with the normal use of the eyes in the patient's daily routine, as compared with other miotics.

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ARE WELDERS SUBJECT TO DEPLETION OF VISUAL PURPLE WHILE AT WORK?

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Welders are chronic protesters. Being hyperconscious of the visual hazards and discomforts of their work, they are a thorn in the flesh to doctors. The most outstanding difference between their work and that of most other employees is in the matter of light. The welder, particularly in arc welding, sees a very small bright area in an otherwise very dark field. Welders' eyes are, supposedly, fully protected from the dangerous actinic rays of either gas flame or electric arc. Is there, in spite of this protection, a depletion of visual purple that might retard adaptation to differences in brightness? If so, would ingestion of vitamin A compensate at all for such depletion?

In order to answer these questions a controlled experiment was carried out on 61 electric welders, in which each welder was tested for speed of dark adaptation before and after a day's work. If welding causes a temporary or semipermanent decrement in visual purple, it would seem reasonable to expect that some decrement could be observed during a day's work. Recognizing that a dark-adaptation test gives no more information than a careful clinical history, we were also aware of the fact that we could not treat these welders as though they were clinic patients. We could not question them too closely as to eyestrain, photophobia, hemeralopia, and other symptoms, or we might precipitate a problem of industrial relations for management to deal with later. Therefore, we could not expect to get a clinical history. Working in war time, moreover, we had to take a man off his job for as short a time as possible, which made the more complicated laboratory tests for dark adaptation impossible.

We chose the simple Bio-photometer test as capable of giving adequate data for this type of industrial experiment. Tests were conducted in a completely dark room and according to the procedure prescribed by the makers of the instrument.

In this test the subject looked at a brightly illuminated field for three minutes. Then, in a dark field, with two fixation lights, a third faint light was introduced and increased in brightness until he could see it. His score represents the least brightness of the test light that was perceptible to him; but the brightness is represented inversely in the score so that high scores mean quick perception, low scores delayed perception. The test was repeated 10 times at intervals of one minute following the preëxposure period. Rising scores at successive test intervals indicate progressive dark adaptation.

METHOD

Each welder was tested before he started to work and again at the end of his eight-hour shift. The welders, without their knowledge, were divided into two groups—an experimental group of 31 and a control group of 30. (Another welder failed to complete the second test and was omitted from the experiment.) Each welder took a capsule before starting work and another in the middle of the shift. Each capsule given to a welder in the *experimental* group contained 10,000 units of vitamin A. Each capsule given to a welder in the *control* group was a placebo, identical in appearance with the vitamin capsules, in order to neutralize any psychologic factor in the experiment. The vitamin-A capsules used were the

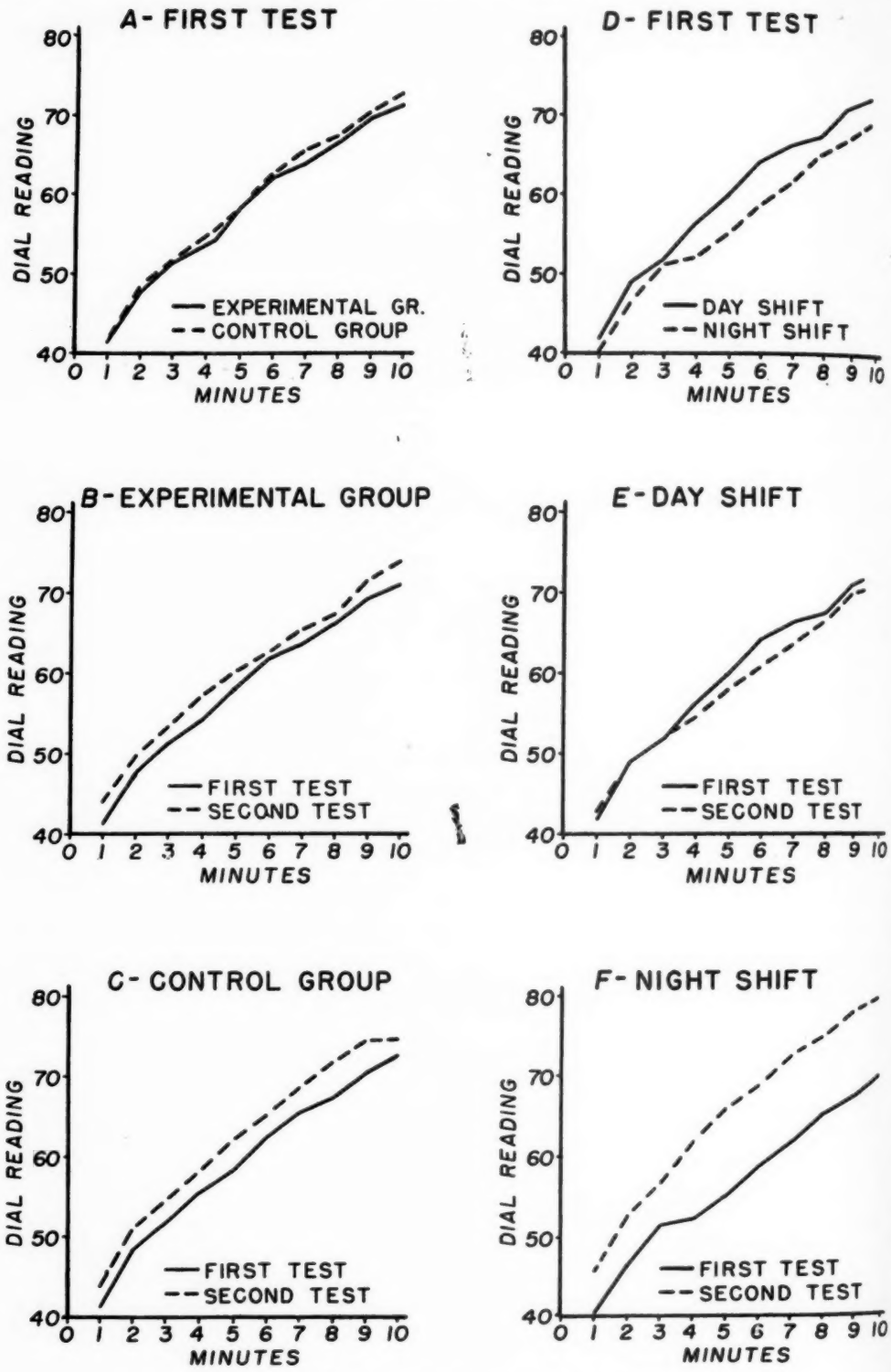

Fig. 1 (Kuhn and Wille). Composite curves on the Bio-photometer test for groups of electric welders.

TABLE 1

INDIVIDUAL MEAN SCORES (AVERAGE OF 10 READINGS) OF WELDERS ON THE BIO-PHOTOMETER TESTS

Experimental Group			Control Group		
First Test	Second Test	Gain	First Test	Second Test	Gain
Day Shift			Day Shift		
55.4	68.5	13.1	57.4	56.1	−1.3
55.3	46.0	−9.3	69.8	68.9	−0.9
75.8	80.6	4.8	63.8	63.9	0.1
61.8	56.7	−5.1	53.6	57.9	4.3
65.1	63.8	−1.3	54.9	45.2	−9.7
56.2	55.0	−1.2	65.8	58.8	−7.0
64.5	60.5	−4.0	77.0	82.3	5.3
52.6	45.8	−6.8	61.4	60.8	−0.6
62.5	59.6	−2.9	49.1	40.5	−8.6
56.8	56.3	−0.5	73.1	77.5	4.4
58.8	61.3	2.5	55.3	59.6	4.3
65.0	67.2	2.2	58.4	63.0	4.6
68.5	61.9	−6.6	57.1	49.3	−7.8
61.6	65.8	4.2	58.6	55.9	2.7
49.1	42.8	−6.3	55.1	54.7	−0.4
69.2	71.1	1.9	54.5	46.9	−7.6
53.3	47.9	−5.4	59.8	61.7	1.9
45.6	52.3	6.7	65.7	60.2	−5.5
62.8	58.4	−4.4			
57.4	57.3	−0.1	Night Shift		
58.9	54.0	−4.9			
			77.8	78.4	0.6
Night Shift			45.3	58.7	13.4
			52.9	59.7	6.8
61.5	65.1	3.6	52.7	74.0	21.3
46.4	53.6	7.2	57.4	62.7	5.3
50.8	73.1	22.3	51.3	56.6	5.3
64.0	66.6	2.6	53.5	66.2	12.7
57.2	64.7	7.5	68.3	83.7	15.4
58.1	60.6	2.5	64.0	79.6	15.6
48.5	61.0	12.5	53.6	70.8	17.2
60.2	66.5	6.3	62.9	62.5	−0.4
53.8	57.7	3.9	52.3	59.9	7.6
58.1	80.2	22.1			
Group Mean			Group Mean		
58.54	60.71	+2.16	59.41	62.53	+3.12

Carptene capsules as prepared by the SMA Corporation. These are of an accepted assay and therefore uniform and exact. The research project received every courtesy and technical assistance from the SMA Corporation.

Of the 31 welders in the experimental group, 21 were on the day shift, 10 on the night shift; of the 30 in the control group, 18 were on the day shift, 12 on the early night shift. The experiment was carried out on a few subjects at a time on different days from late January to early March, 1942.

In order to study various factors simultaneously, the following additional information was obtained from the foreman: How long on this shift? Type of eye protection used; type of welding (constant welding, tacking, automatic, inside, and the like); personal habits—whether single or married, at home or rooming, and contents of lunch basket. At the time of the second test each welder was asked whether he had been exposed, unprotected, to any flashes that day. The data, charts, and comments were analyzed by S. Edgar Wirt, Ph.D., in the Laboratory

of Applied Psychology at Purdue University.

Analysis of findings

The data here presented are based on the averages of individual scores for 10 successive readings and the averages of groups of welders for each reading. Table 1 shows individual mean scores (average of 10 readings) for the 61 welders on first test and second test, gross gain, and also group averages for the experimental and control groups.*

Figure 1*A* shows composite curves for experimental and control groups on the first (or prework) test, representing group average scores for each of the 10 successive readings on the test. The rising slope of the curves indicates progressive dark adaptation. The control group showed slightly higher scores, but the mean difference (0.87) between scores for the two groups is not significant with this number of cases. Essentially the two groups were equivalent at the beginning of the experiment. These curves are lower than the expected range indicated on the Bio-photometer record chart, but they are both higher than the average (52.85) of tests on 17 office workers obtained by the same tester. The criterion in this experiment is a possible decrement during a period of a day's work rather than responses to the test in comparison with norms representing superior performance on the test.

Figure 1*B* shows composite curves for the experimental group only on the first (or prework) and second (or postwork) tests. Scores on the second test tended to be slightly higher, following the taking of carotene, but the mean difference (2.16) is not unquestionably reliable for this number of cases.

Figure 1*C* shows composite curves for the control group only on the first and second tests. Scores on the second test tended to be higher. The mean difference (3.12) is greater than that for the experimental group. The fact that welders who took vitamin A showed no greater gains than those who did not, might be interpreted as indicating that these welders were not deficient in vitamin A in the first place. The greater gain in dark adaptation in the group that did not receive carotene may be explained in part by the fact that this group included a slightly larger proportion of welders on the night shift, a difference that will be discussed later.

None of the personal information gathered about each welder showed any clear relation to these differences in gain; the individual differences are not explained or accounted for by any of those items. The average gain for the whole group, shared almost equally between experimental and control subjects, was 2.61. Such a difference is attributable, in part at least, to experience with the test—on the second test the subjects knew better what was expected of them and responded more promptly. The reliability of this test (correspondence of scores on first and second tests) was 0.62 for the entire group (0.85 for those on the day shift only). This reliability, though low for individual prediction, is adequate to reveal any important differences between groups of the size used in this study.

The results of these experiments indicate that welders as a group do not suffer loss of dark adaptability during a day's work. Individual ocular complaints of welders are probably not due to depletion of visual purple. Our clinical experience indicates that the complaints are consistently due to careless use of protective equipment or inadequate equipment. Disregarding the need for protection against "side flashes" from other arcs, welders

* Readers who are interested in the details, statistics, and methods of statistical analysis may receive them from the authors upon request—they have been almost entirely eliminated from this report.

are known to receive burns of varying degrees.

It is apparent from table 1 that gains were more consistent in both control and experimental groups among employees on the night shift. This difference may be significant in determining certain visual problems of welders. Figure 1*D* shows composite curves on the first test only for 39 welders on the day shift and 22 on the night shift. Welders coming to work on the day shift showed slightly higher scores than those starting the night shift, but the mean difference (3.32) is not large enough to be unquestionably significant with this number of cases. Such a difference suggests, however, that welders coming to work on the night shift have previously spent more hours in bright light than those coming to work on the day shift.

Figure 1*E* shows composite curves on first and second tests for 39 welders on the day shift. Scores on the second test (after a day's work) tended to be lower than on the first test, but the mean difference (1.30) is not great enough to be unquestionably significant for this number of cases. Some slight drop in the retest scores would be expected from the fact that these subjects as a group were above average on the first test.

Figure 1*F* shows composite curves on first and second tests for 21 welders on the night shift. Scores on the second test were definitely and significantly higher than on the first test. Welders on the night shift gained in speed of dark adaptation during the period of their work, while those on the day shift did not gain but lost slightly. A reasonable explanation of the difference would be that the night welders accumulated during their work more experience in dark adapting than did the day welders. Presumably a difference in brightness of environment would affect welders most during the time they were not welding. Probably night welders face their arcs for a shorter proportion of the total time on the job than do day welders. However, the daytime illumination in this plant is not too good, and the night illumination is good. Much welding is done inside tanks where supplemental light is necessary at all times. These working conditions, however, do not provide a conclusive explanation of the difference between test results on day and night welders.

More complete understanding of the visual problems in welding will require further experiment. One question that needs to be determined is whether welders are bright- or dark-adapted when they watch an arc through a dense optical filter and how they adapt differentially to the bright central and dark peripheral areas of their field of view. If, as a supposition, welders must be dark adapted on the job, it might be well for day welders to use an auxiliary filter in the form of goggles under the welding mask at all times to avoid intermittent demands for bright adaptation, and for welders to wear such a filter on the way to work in order to initiate the necessary dark adaptation for their work. (This procedure would be comparable to the precautions adopted in case of night flyers.) The real challenge in the welding problem is to the industrial engineer and to the safety department's educational program.

Summary

1. Sixty-one welders were given the Bio-photometer test for speed of dark adaptation before and after a day's work. Thirty-nine were on the day shift, 22 on the night shift.

2. Half the welders (31) each received 10,000 units of vitamin A before starting work and again in the middle of the shift. The other welders received a placebo at the same time.

3. There is no evidence of a general lack of dark adaptability among weld-

ers and no evidence of any decrement in this function during an eight-hour shift.

4. Welders who received vitamin A showed no greater gain in dark adaptation than those who did not receive it. This should not be interpreted to mean that cases of vitamin-A deficiency would not respond to such treatment, nor that these welders would not respond with longer treatment or under different conditions.

5. Individual differences in age, domicile, type of welding, goggles, and food showed no relation to differences in gain or loss of speed of dark adaptation during an eight-hour shift.

6. Welders on the night shift showed a significant average gain in dark adaptation during their work. This is attributed to a greater demand for dark adaptation during periods when they were not actually welding. Several inferences are developed from this fact toward possible improvement of visual ease in welding by further visual engineering in this field.

7. The clinical conclusion is that the excessive number of complaints among welders is due to inadequate protective equipment or carelessness in its use.

CONTRACTURE IN OCULAR-MUSCLE PARALYSIS*

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A contracted muscle is permanently shortened and, because of pathologic changes in its makeup, due to atrophy from disuse, becomes a more or less rigid cord—increasingly so as time goes on. It is, therefore, unable to elongate by innervational relaxation. How then can a successful functional as well as cosmetic result be expected from tendon transplantation? The answer is that a functional result, except within a limited range of motion, cannot be expected and a cosmetic one can be secured only by the aid of mutilating operations such as tenotomy or recession of the contracted muscle. At this time any gain in rotation in the direction of the paralysis incurs a loss in the direction of the contracture. This loss is greater if the contracted muscle has been tenotomized than if it is normal because, being shorter, it will reattach farther back on the globe and because of the impaired function that attends its condition.

In numerous papers published since I performed my first transplant operation in 1916, I have insisted on the absolute need to do the operation before contractures have started in the opponents. Apparently I have not been able to put over the idea, the truth of which would seem to be perfectly obvious, for practically all patients sent to me for operation have been advised to delay a year (the favorite time limit) and therefore have definite contractures. When such good functional results can be obtained without tenotomy, in the absence of contractures, it seems a shame to have so many unsatisfactory results due entirely to a misunderstanding of conditions.

The idea of placing a set time limit before considering transplantation is wrong simply because there is no time limit as to the appearance of contractures. I have seen patients with contracture as early as three weeks after the injury and others with none as late as three months. In several of the latter cure was spontaneous, so that my idea, that contractures do not appear unless the paralysis is complete and permanent, may be correct.

To be on the safe side in this respect the test for contracture should be made every week and the operation performed as soon as it becomes positive in the slightest degree. The test is made as follows:

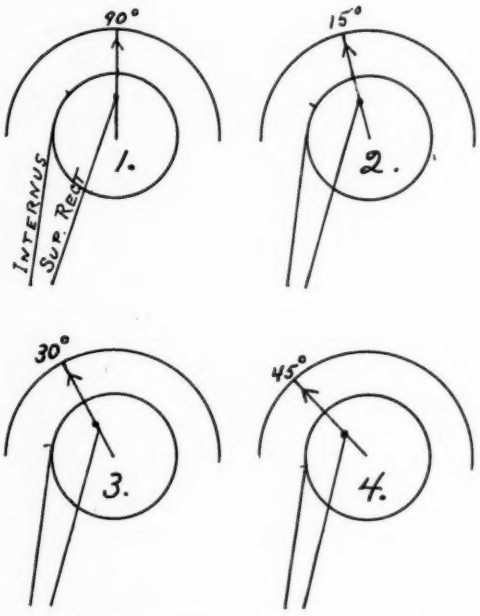
1. Anesthetize the eye. 2. Grasp the suspected tendon with fixation forceps. 3. Exert traction and at the same time have the patient direct the gaze of his good eye in the same direction—this to cause innervational relaxation of the suspected muscle. 4. Contracture is present: (a) if resistance is felt; (b) if the eye cannot be rotated the normal amount by traction. That this can be done in the absence of contracture we all know because this procedure is a necessary part of all muscle operations in order to bring the tendon into position for operation.

Therefore, in abducens palsy, for example, if the eye can be forcibly rotated out only 30 degrees, instead of the normal 45 degrees, 15 degrees of relaxation of the internus has been lost. As contractures increase, forced outward rotation becomes less and less until, at the worst, the eye is fixed in maximum convergence and cannot be moved in any di-

* Read at 1941 meeting of the Pacific Coast Oto-Ophthalmological Society, at Los Angeles.

rection, even in the vertical. I have seen one patient in this condition who had delayed transplantation for three years after his head injury, on the insistance of the neurologic surgeon in charge. Transplantation was mechanically impossible because the tendons could not be brought into view.

Many authorities state that contractures do not occur in congenital paralyses. This is not so, for I have operated upon quite a number of such patients. I have one such case under observation now, in which the transplant has turned the eye out although I did a careful tenotomy of the internus, as a preliminary operation, six weeks before the transplant. We even have partial contractures in long-standing cases of monocular squint.



Figs. 1 to 4 (O'Connor). Showing the primary position (fig. 1); and the increased shortening of the internal and vertical rectus muscles: at a contracture of 15 degrees (fig. 2)—internal, 3 mm., vertical, 1 mm.; at a contracture of 30 degrees (fig. 3)—internal, 6 mm., vertical 2 mm.; at a contracture of 45 degrees (fig. 4)—internal, 9 mm., vertical, 3 mm.

Figures 2, 3, and 4 show the actual amount (in millimeters) of shortening of the internal and vertical recti, as the contracture increases, in a case of abducens palsy.

Anyone interested in this subject is referred, for details, to my paper published in the American Journal of Ophthalmology, issue of September, 1935. Here I will quote only its opening and closing paragraphs. The first is:

"The first question is 'Who should decide when to operate?' The answer of course is self-evident and yet in a recent meeting a neurologic surgeon stated that he never referred such cases to the ophthalmologist until a year had elapsed from the onset of the paralysis. Of course he thought he was giving his patients every chance to get well without operation but overlooked the fact that he is virtually deciding the conduct of a condition entirely out of his line and is reducing the prospect of a good result."

The last paragraphs are:

"1. An ophthalmic surgeon who is able to perform the necessary operation should be permitted to decide when and how to operate. In order that he may be free to do this every patient should be under his observation from the onset of the palsy.

"2. Complete palsies should be brought to operation as soon as it is certain that they are permanent. Children with congenital palsies should be operated upon in the third year in the interest of binocular vision.

"3. In order to avoid disabling tenotomies the operation must be done before contractures have started in the opponents.

"4. The writer naturally feels that the operation of choice is his new one by

which the tendon halves farther from the palsied muscle are used. In the case of an abducens palsy this means transplantation of the nasal halves of the vertical recti. The cinch loop, of course, must be used for secure anchorage in the transplants."

450 Sutter Street

Discussion

Dr. George N. Hosford (San Francisco): My story will be even briefer than Dr. O'Connor's. I had always had the highest regard for the teachings of the neurologists and neuro-surgeons of the University of California under whom I studied. It, therefore, took me a good many years to come around to Dr. O'Connor's point of view. Some two years ago I became convinced that he was right and did a transplantation for paralysis of the external rectus at eight months instead of waiting the year that is usually advised.

The results were excellent. The next similar case that came under my care I operated on three months after the injury—the result was still better. Last week I did one that had been allowed to go for two years. It was a case that Dr. O'Connor had seen and advised operation over a year ago. One thing after another prevented the performance of the operation and I believe that this case will come in the category of his last illustration—that is, the result will be disappointing.

The orthopedic surgeons formerly did very little about the effects of anterior poliomyelitis until long after the disease had subsided. This is no longer the standard practice. They do everything possible, as soon as the acute symptoms of the disease have subsided, to keep the muscles in proper shape for future use or transplantation if that be necessary. The ocular muscles do not lend themselves very well to heat, electricity, or massage, and I should like to make a plea for consideration of early transplantation operations—particularly for sixth-nerve injuries.

These patients are incapacitated for their usual occupation during the waiting period because of the diplopia. In general these cases do not get well by themselves no matter how long we wait. It is, therefore, logical to institute surgical treatment early.

Dr. O'Connor (closing): I have already stated that, in my opinion, the onset of contracture means that the paralysis is permanent. Frequent tests for contracture will determine this point and operation should be done at the first sign of a positive test. Theoretically it should be done before this time but, practically, there is no other way to tell whether or not the paralysis is going to clear up. If, in making the contracture test, the eye cannot be rotated outwards 45 degrees (in sixth-nerve palsy) contracture has begun. According to this plan there is no need to set a particular time, as regards injury, at which to operate. The appearance of contracture decides the question.

I doubt if much harm would result, provided mutilating tenotomies have not been done, if the palsy should recover after an early transplantation has been done. This mishap could not occur if my idea, that contracture means permanence, is correct.

However there is no doubt but that the man who is going to do the transplant should be on the case from the start and decide when to operate.

CASE REPORT OF CONGENITAL GROUPED PIGMENTATION OF THE RETINA WITH MACULOCEREBRAL DEGENERATION*

GERALD T. SCHWARZ, M.D.
Cleveland, Ohio

The bilateral appearance of congenital grouped pigmentation of the retina is uncommon. Association with maculocerebral degeneration is apparently unreported. This report concerns such a case.

A six-year-old white boy, of Irish-German descent, was first seen in the Department of Pediatrics of the Vanderbilt Clinic on December 12, 1941, for the treatment of a hernia and crossed eyes.

The family history excluded chronic diseases, mental disorders, epilepsy, consanguinity, or blindness, although a complete pedigree was unobtainable. The hernia had been present since birth and had caused no trouble. Full recovery followed an uncomplicated attack of measles at the age of one year. Tetanus antitoxin had been administered in August of 1941, following a laceration of the foot. Walking was begun at the age of one year and toilet habits were established at two years, although enuresis persists. It was not recalled by the family when the child began to talk. He had never attended school.

The patient was a moderately developed, well-nourished, excessively active boy, not acutely ill. He weighed 41 pounds, was 44 inches tall, had a chest measurement of 21 inches, and a head circumference of 21½ inches. His speech was retarded for his age. The only positive physical findings were: Caries of numerous teeth; bilateral small shotty enlargement of the cervical lymph nodes; diastasis of the aponeurosis recti abdominis beginning two centimeters below the umbilicus; and a congenital, reducible, left-sided, indirect, inguinal scrotal hernia.

Psychometric examination, conducted at the Psychiatric Institute, determined the mental age to be three years and two months as measured by the use of Stanford-Binet scale. Verbal tests were omitted and allowance made for them. The conclusion drawn from these findings was that the boy was retarded in general intelligence and manual efficiency.

The roentgenographic findings revealed no chest pathology. The skull, sella turcica, the base of the skull, and all paranasal sinuses were normal. The left orbit was slightly larger than usual, but no lesion was present. Mantoux and Kline tests were negative, whereas the Schick test was positive. The urine-analysis, hemoglobin determination, and examination of the formed elements of the blood were without deviation from normal. Blood cholesterol was 237 mg. percent.

The Department of Pediatrics advised deferring operation for repair of the hernia. The family requested treatment of the squint, so he was referred to the Eye Department of the Vanderbilt Clinic on December 15, 1941.

The visual acuity for distance, as determined by the use of the "E" chart, was found to be 20/33 and 20/70 for the right and left eyes, respectively. The external examination of the eyes and adnexa showed no abnormalities. Coöperation was not obtained for examination of the fundi through the undilated pupils. The eyes were normally situated in externally normal-appearing orbits. An alternating esotropia measured approximately 60

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prism diopters by cover testing for both near and distance fixation.

Refraction under complete atropine cycloplegia by retinoscopy and acceptance resulted in visual acuity for distance of 20/50 and 20/70 O.D. and O.S. with +5.50D. sph. and +5.75D. sph. placed before the right and left eyes, respectively. The child's movements in a darkened room showed no evidence of abnormal reduction of acuity with the reduction of illumination.

Further examination of the fundi with the patient under anesthesia and correction of the esotropia by surgery were advised. He was therefore admitted to the service of Dr. John H. Dunnington, at the Institute of Ophthalmology, Presbyterian Hospital, New York City, on January 20, 1942.

Fundus examination was completed with the patient under general anesthesia. Small spots or flecks of pigment were noted in the peripheral portions of both retinas. These were sharply demarcated and of the same varied shapes as those seen in congenital grouped pigmentation of the retina. All occurred beneath the retinal vessels. The entire periphery of each fundus was covered by these flecks in contrast to the usually noted, sector-shaped areas. The posterior poles of each eye were free of the fleck-shaped pigment deposits, but changes were present in and about both maculas. These were of granular, dustlike, salt-and-pepper appearance with numerous glistening, pin-point areas showing through. No foveal reflexes could be obtained. A small ovoid, yellowish colored, depigmented area appeared beneath and temporal to the macula of the right eye. No areas of hemorrhage nor of exudate were noted in either fundus. The discs were of normal outline and color. An excess of glial tissue was present about the vessels on both discs. Retinal vessels and choroids were normal.

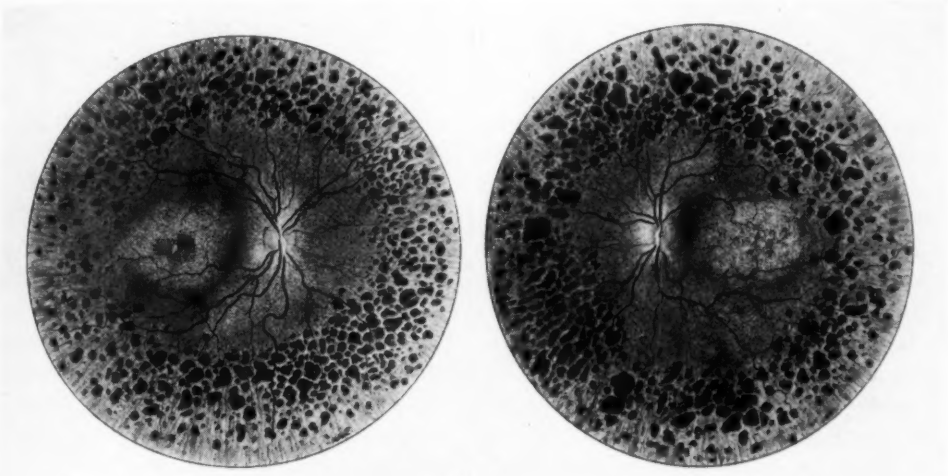

Fig. 1 (Schwarz). The appearance of the fundus of the right eye (on the left) and of the left eye (on the right) in a case of congenital grouped pigmentation of the retina with maculocerebral degeneration.

Tests for color blindness met with no success; the examination of the field of vision or search for central scotomata could not be made, due to the patient's age and mental aberrations.

Neurologic examination, conducted by Dr. Mary Daly in the Neurology Department of the Vanderbilt Clinic, showed the gait to be normal. Muscle strength was normal with fair tone, but the muscle volume was noted to be subnormal for a child of his age and stature. The left hand was used for grasping. No involuntary movements were present, and all associated movements were normal. Equilibratory coördination was normal with eyes open and closed, as the child stood on either or both feet. The nonequilibratory movements were normal. All reflexes save the ciliospinal were present: the radial, ulnar, and suprapatellar ones were sluggish. No abnormal reflexes nor signs of meningeal irritation were found. Tactile and pain sensations were normal. Difficulty in phonation was the only evidence of abnormality in the cranial nerves. The impression which this examiner gained was that the child suffered from a maculocerebral degenerative process.

The fundi of the mother and the maternal grandmother disclosed no lesion.

The esotropia was successfully treated by surgery and correction of the refractive error was obtained with glasses.

Discussion

This patient presents the combined changes of congenital grouped pigmentation of the retina and maculocerebral degeneration of the juvenile type (apparently the Batten-Mayou or Spielmeyer-Vogt type). As has been mentioned, the distribution of the retinal pigment flecks is about the entire periphery and not in the usual sector-shaped areas. The macular degeneration appears to be early, since the arteries and the optic nerve are not affected.

None of the reviewed cases of congenital grouped pigmentation of the retina revealed any with the combination of findings here presented. Löwenstein[1] reported one case with bilateral central pigment flecks and small retinal cysts. He considered the pigment disturbances to be of the congenital grouped type. Höeg[2] said that the commonest grouping of the pigment flecks is sector shaped, with the apex toward the disc. Although he does not present a case he states that the pigment can be distributed about the entire periphery. Welter[3] presented a case of bilateral congenital grouped pigmentation. The entire fundi of both eyes including the maculas presented flecks of pigment of varying sizes. The involvement of the maculas in his patient, a 10-year-old child, was that of fine pigment flecks in and about the macular regions. The maculas showed no degenerative process. The visual acuity and the central and peripheral fields were normal in both eyes. A number of the reported cases were of the hypermetropic type and in some there was strabismus.

The fundi herein described were examined, while the patient was under anesthesia, by Drs. Arnold Knapp, John H. Dunnington, and other members of the Institute staff.

Summary

An unusual case of congenital grouped pigmentation of the retina and associated maculocerebral degeneration is described.

10515 Carnegie Avenue.

References

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[2] Höeg, Niels. Die gruppierte Pigmentation des Augengrundes. Klin. M. f. Augenh., 1911, v. 49, pp. 49-79.

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NOTES, CASES, INSTRUMENTS

REFRACTION CLINIC*

DISCUSSION BY ALBERT E. SLOANE, M.D.†
Boston, Massachusetts

Case 1. Mr. F., aged 51 years, had been given four pairs of bifocals in the past eight years and had never been satisfied with any of them. He claimed that he continued to become confused. His occupation was that of a ticket collector in a busy theater and he must at one moment see at near in order to read the seat number on the ticket, and the next moment must see off in the distance.

He was then wearing: O.D. −3.50D. sph.; O.S. −4.25D. sph.; add +1.50D. sph.

Examination revealed: O.D. vision was 15/200. With a −3.25D. sph. ⌯ −.50 D. cyl. ax. 75° vision equalled 20/20. O.S. vision was 10/200. With a −4.00D. sph. ⌯ −.25D. cyl. ax. 180° vision equalled 20/20. With an added +2.00D. sph. he could read J1.

Single binocular vision could not be demonstrated by the Maddox rod, stereoscope slit slides, or the cover test. A definite alternating exotropia of 25 degrees was noted.

DISCUSSION

Discomfort with glasses can usually be due to three causes: 1. Inaccurate refractive correction producing a disturbance of focus. 2. Binocular incompatibility, whether it be due to muscle imbalance or anisometropia with resulting aniseikonia. 3. Faulty, mechanical properties of the glasses and frames.

It is at once apparent that the first instance is not the difficulty since the old correction does not differ appreciably from the new findings. It is not usual for the need of a 0.25D. or a 0.50D. cylinder to produce discomfort in a correction where the spherical element is as much as 3.5D.

The second instance obviously is not the cause of this man's difficulty because an alternating exotropia exists; no single binocular vision is present, therefore there is no problem of binocularity.

The third instance sheds some light when one considers the nature of this man's duties and the characteristics of his ocular function. Since he is a true alternater, he fixates equally well with either eye. Have you ever noticed the characteristic choice of a true alternater as he looks from one side to the other? In the case of internal strabismus the eye that would utilize the internal rectus is the fixating eye, so that in looking from the extreme left to the extreme right it is first the right eye that fixates and then the left eye. In a like manner the "exotrope" prefers his fixating eye to be the one that is utilizing the external rectus. Thus this man in looking from one side to the other changes fixation and the eye that has deviated does not quickly find the small reading segment readily, since it has been in a divergent position. It is this phenomenon that probably confused him so much.

SOLUTION

Since this man has no binocular vision, it was decided to give him single-vision glasses with the distance correction in the right eye and the near correction in the left eye. In this way the bifocals and their problem could be eliminated. *The glasses ordered:* O.D. −3.25D. sph. ⌯ −.50D. cyl. ax. 10° (distance); O.S. −2.00D. sph. ⌯ −.25D. cyl. ax. 180° (near).

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† Director of the Department of Refraction.

This solution was very effective in this case as time has proved.

Questions by house officers

H. O.: "Did it take long for the patient to become accustomed to his glasses?"

Dr. Sloane: "It took this man about three days."

H. O.: "Would it not be advisable to give a plano in the left eye for near work?"

Dr. Sloane: "For a 4.00D. uncorrected myopic eye the far point is 10 inches, which is much too close for practical purposes."

H. O.: "Are these glasses to be used only for work?"

Dr. Sloane: "No, these are 'all-purpose' glasses."

H. O.: "What tests were made to determine that the man had no single binocular vision?"

Dr. Sloane: "The most important test, as well as the quickest, is the monocular cover test. With the full correction in place before both eyes, I occluded the patient's right eye while the left eye was fixating a distant object. Under cover the right eye assumed a divergent position which would not change when the cover was removed, proving that the right eye did not participate when the left eye was fixating. This was also true of the left eye when the left eye was covered in a similar fashion. This test proved two things: that the patient had no binocular vision and that the patient had an alternating condition."

H. O.: "What would cover test with prisms show in this case?"

Dr. Sloane: "The only thing that prisms used with the cover test would do in this case would be to give an objective measure of the angle of squint."

H. O.: "What would be the response of the eyes?"

Dr. Sloane: "I assume you mean that if the prisms which corrected the squint were in place so that the images fell in corresponding positions in both eyes. In such case I would say that this person would still have no binocular vision but suppression in one eye or the other."

H. O.: "Wouldn't the patient have trouble trying to find the right lens?"

Dr. Sloane: "Not so much as he did with his bifocals. This patient was not told what was being done for him nor did I try to explain the type of correction I was giving him. What is most important is that he was helped effectively."

Case 2. A dentist, aged 50 years, presented himself for examination and correction.

Examination revealed: Vision was O.D. 20/50. With a +1.50D. sph. vision equalled 20/20. Vision was O.S. 20/50. With a +1.50D. sph. vision equalled 20/20. With an added +1.75D. sph. (O.D.), he read J1; with an added +1.25D. sph. (O.S.), he read J3.

Phoria test: distance: 2^{Δ} exophoria, vertical orthophoria; near: 6^{Δ} exophoria, vertical orthophoria.

Discussion

This type of case may be solved in a number of ways. The first and most important consideration is the nature of work that a dentist must do. Certain conditions must be satisfied. First, he must have clear vision while working in the mouth and yet his range must be large enough so that he can use his hands freely, both in reaching for instruments from his table and in doing the dental work itself. It is helpful for him to be able to see at a distance also. Therefore, our prescription should be tempered in such a way that we can give him maximum distance visual acuity and adequate near vision consistent with the largest range. Bifocals very often will solve this problem if they are prescribed with the seg-

ment as large in size as possible. I would suggest that +1.50D. sphere with an addition of +1.25D. sphere be given. Since this is to be an occupational glass, a bifocal of the Ultex variety is indicated, because in this type the segment can be made as large as desired, and the difficulties associated in walking with a large-segment bifocal would not be important. In an ordinary-size segment it would be difficult to maintain fixation through the near portion when the head is cocked in the extreme side positions that a dentist uses. Thus, with ordinary bifocals he may be looking through the segment with one eye and through the distance glass with the other.

A word about the range is necessary. If you compare the range obtained with a +1.25D. sphere addition, and that with his full presbyopic add (+1.75 sphere) you will note:

Example

Let us assume for the sake of even numbers that he has 1¼ diopters of accommodation.

Therefore with *+1.75D. sphere addition:*

+1.75D. sphere (Add)
+1.25D. sphere (Acc)

+3.00D. of near point (P.P.) of 13 inches and P.R. of about 22½ inches. *Thus: A range of about 9 inches.*

Similarly, with *+1.25D. sphere addition:*

+1.25 sphere (Add)
+1.25 sphere (Acc)

+2.50D. of near point (P.P.) of 16 inches and P.R. of about 32 inches. *Thus: A range of about 16 inches.*

In addition to the occupational glass I would give a second pair of bifocals utilizing the full presbyopic addition made up with an ordinary-sized segment. These to be used for all eye work not associated with his occupation.

℞ O.D. +1.50D. sphere } Add +1.25D. sphere
O.S. +1.50D. sphere } in large-segment Ultex

O.D. +1.50D. sphere } Add +1.75D. sphere
+1.50D. sphere } in usual bifocals

A second solution that frequently works out well is to give bifocals with the full presbyopic correction for constant wear and a single-vision glass equivalent to the working add (+1.25 sphere) to be used only at work. This has the advantage of giving a full glass suited to his work but necessarily blurs his distance vision.

℞ O.D. +1.50D. sphere }
O.S. +1.20D. sphere } Add +1.75 sphere

O.D. +2.75D. sphere } For occupational
O.S. +2.75D. sphere } work

A third solution might be three pairs of single-vision glasses: single vision for distance; single vision for work (+1.25 sphere add); single vision for near (reading); but this solution does not usually satisfy most dentists.

℞ O.U. +1.50D. sphere Distance vision
O.U. +2.75D. sphere Occupation
O.U. +3.25D. sphere Reading

Questions by House Officers

H. O.: "What size should the segment be?"

Dr. Sloane: "About one half the size of the lenses."

H. O.: "I would think that the full presbyopic addition might be the one the dentist would prefer because he does such fine work."

Dr. Sloane: "It has been my experience that they prefer slightly less magnification if the range can be increased. Occasionally, if there is need for higher magnification, they learn to put on the reading glasses with its stronger addition for that particular part of the work."

H. O.: "How about trifocals?"

Dr. Sloane: "Trifocals theoretically would offer the ideal solution but because of their expense and the relatively small size of the segments they have not been practical."

H. O.: "Are slip-on adds popular?"

Dr. Sloane: "Theoretically this will do the trick, but it is not popular because, first, the increase in weight makes them uncomfortable; second, the lenses become scratched; third, too many lens surfaces increase the number of disturbing reflections from the bright lights the dentist uses; fourth, there is no arrangement for clear distance vision."

BACILLUS PYOCYANEUS INFECTION

A CASE REPORT

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Pittsburgh, Pennsylvania

Bacillus pyocyaneous is one of the less virulent pathogenic bacteria. It is frequently found as a harmless parasite upon the skin or in the upper respiratory tracts of animals and men. When present as a contaminant in ocular infection, however, the organism is very destructive because of the extreme vulnerability of ocular tissue. Only casual references are made in the literature to B. pyocyaneus as an etiologic organism in ocular infection; these citations usually show it to be associated with imbedded corneal foreign bodies. Once infection has become entrenched, results are highly disastrous.

A case of bilateral infection is presented: M. J., aged 19 years, a Negro, was admitted to LaGarde General Hospital, from the maneuver area at Lake Charles, Louisiana, on August 18, 1941, suffering from severe photophobia and marked discharge of 48 hours' duration. Examination revealed a severe purulent conjunctivitis, with marked chemosis and multiple staining ulcerations of each cornea just below the superior limbus, at the 2-o'clock meridian of the right eye, and at the 12-o'clock meridian of the left eye. There were also diffuse nonstaining "smoglike" edematous infiltrations. Blepharospasm and photophobia were intense.

A smear was taken and a culture made. The culture was found to be pure B. pyocyaneus. Local therapy consisted of the administration of atropine, compresses, irrigations, and 4 grams of sulfathiazole daily. Slight improvement was first noted after five days. On August 27th (the 9th day) there was no longer any staining of the ulcers. Recovery was rapid after this date. The doses of sulfathiazole were discontinued on August 30, 1941, because of the reduction to 3,200 in the white-blood-cell count. On September 18, 1941, visual acuity was: R.E. 20/30; L.E. 20/70. Five days later vision had returned to 20/20 in each eye. Accurate estimation of vision was impossible on admission, because of the intense blepharospasm and photophobia. At the time of discharge there remained only a faint irregular nebula near the limbus of each eye.

Comment. A case of B. pyocyaneous infection is presented in which there was complete recovery. A review of the literature revealed that this type of infection has a high rate of ocular destruction. With the advent of the sulfonamide drugs, however, the percentage of recoveries, though still not great, has sharply risen. In this case the administration of sulfathiazole was started on the day of admission and before the results of the culture were obtained.

LaGarde General Hospital,
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COLOR PERCEPTION

P. B. WILTBERGER, M.D.
Columbus, Ohio

After years of experience with various color tests for the detection of defective color vision, especially the Japanese

"Ishihara" and the German "Stilling" tests, one comes to the conclusion that such "pseudo-isochromatic" plates furnish us with a rapid "rough-screening" test. These tests separate individuals who are normal or hypercritical in color perception from all others. This is not all they do. By these tests, and others like them in which "pseudo-isochromatic" plates are used fully 10 percent[1] of the male population is misbranded as "color blind."

Genetically, it is an accepted fact that about 4 percent of the male population is dangerously color defective for red-green (red-green blindness). What of the other 6 percent? It is this group which these "pseudo-isochromatic" tests misbrand as "red-green blind," "red blind," or "green blind."

In order to evaluate this discrepancy it becomes necessary to reclassify the population in regard to color perception.

The following classification is presented because it properly places the 6 percent who are now marked as failures and solves some genetic problems:

1. *Hyperchromic* individuals (color perception high above normal).
2. *Normal* individuals.
3. *Chromasthenic* individuals (color weak, not color blind; cannot differentiate between pastel colors).

* * * *

4. *Hypochromic* individuals (extremely color-weak, cases of so-called "deuteranopia," "protanopia," and "tritanopia").†
5. *Achromic* individuals (the true color-*blind,* who perceive only various saturations of white, black, or intermediate gray).

NOTE: Classes 1, 2, and 3 are not color defective. They should pass all color tests. Classes 4 and 5 are dangerously color defective and should fail all tests.

It has been demonstrated repeatedly that there are those who, when tested by the Ishihara method, can read both the number that is read by the "normal" individual and also, with just as much ease, the number on the same plate that is supposed to be read *only* by the color-blind. *This fact in itself shows this test to be unreliable.* Another common finding is that an individual may read one plate as if he were a normal individual and the next plate, made up in the same colors, as though he were a color-blind individual. This situation, of course, is absurd. To brand a person as color-blind is to court trouble. Particularly if the livelihood of this person depends upon color vision as a necessary part of his gainful employment in the field for which he has trained himself.

Lately, in many industries, a color test has been added to the physical examination required for employment. It happens, therefore, that occasionally, upon re-examination, men who have long been with these companies are suddenly faced with the statement that they are now color-blind and will have to seek other employment. It is unfair to these men to discharge them from jobs which they have held for years, to force them to lose their seniority rights and other privileges, and to seek other employment at an age when learning is more difficult, merely because they are tested by a method which is admittedly "pseudo-isochromatic" (false).

These pseudo-isochromatic color-vision tests—namely, the Ishihara, the Stilling, and a combination of the two that is printed in this country—place the line of demarcation between the normal and the color-blind between 2 and 3 in the aforementioned classification.

Individuals in the third class men-

† The author's files containing records of over 5,440 aviation examinations, fail to show even *one* "yellow-blue" blind case (tritanopia).

tioned, namely the *chromasthenic* group, are not color-blind at all.[1] (The word is a misnomer and should be eliminated from our nomenclature.) They are in no way handicapped in any profession or skilled trade. *Physiologically,* they are normal for color perception but *slow* in comprehension of color perception. They are *color weak.*

Individuals in the fourth class, the *hypochromic,* are very much weaker than those in the third class. They are definitely subnormal as regards their ability to name and match colors and are extremely slow and unreliable in their ability to match or name delicate pastel colors or weak saturations (high dilutions) of colors. They can, however, name and match colors that have a high saturation, strong hue, and high value. (This accounts for some discrepancies in the Holmgren test.) These individuals are a hazard to themselves and to others if they are employed in work requiring accurate color perception.

The fifth class, the *achromic* individuals, need only be mentioned in passing. They represent a very small percentage[1] of the population (less than 0.5 percent). They are, of course, *the real color-blind.* They see no color. Colors to them are just shades of black and white and intermediate grays.

There are numerous other color tests. The oldest and perhaps one of the best is the Holmgren yarn test. This test is often misused by the person giving it and often the results are misinterpreted by the physician. It has the disadvantage of becoming dirty, of fading, and of course the time required in giving it is too long.

In giving all these tests a good strong daylight of northern exposure is required (at least 16 or 18 Weston). Between 10 a.m. and 2 p.m. is the best time. Artificial white light may be used, but the light source must be reasonably close to the test object (not over 24 inches) and should come from over either shoulder.

The physician or person conducting the test should be normal or of the hyperchromic type.

It is a fact that an applicant being examined from time to time may pass a given color test in one office and fail the same test given in another office. This is more often the case with the Ishihara and Stilling tests than all others and is due to the lighting equipment and the time of day. If a chromasthenic individual is examined by strong daylight between 10 a.m. and 2 p.m. he may fail the Ishihara test or perform it badly. If he is examined earlier than 9 a.m. or later than 4 p.m. he will easily pass the same test given by the same examiner. This same result will be obtained if old electric lights are used. Old electric lights give out more of the orange-red light than do new ones. If examined by new lights he will fail. If examined by old lights he will pass. This can easily be proved by placing a very delicate red or orange screen between the light source and the test book.

This is all very confusing to the examiner, especially in aviation medicine. If the regulations are strictly adhered to, then many applicants (6 percent) fail, simply because a method of examination is used which is, to say the least, inaccurate.

We are losing 6 percent of our available potential pilots by the continued use of an inaccurate Japanese color test.

350 East State Street.

Reference

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SOCIETY PROCEEDINGS

EDITED BY DR. RALPH H. MILLER

COLLEGE OF PHYSICIANS OF PHILADELPHIA

SECTION ON OPHTHALMOLOGY

October 16, 1941

DR. FRANCIS HEED ADLER, *chairman*

MOLLUSCUM CONTAGIOSUM WITH CORNEAL COMPLICATIONS. TWO CASES

DR. T. H. COWAN presented a brief résumé of molluscum contagiosum in its general and ophthalmologic aspects together with a digest of the literature pertaining to eye complications. Two cases were then presented in which a molluscum contagiosum of the lid border was associated with a chronic conjunctivitis and multiple superficial erosions of the cornea.

Discussion. Dr. W. Braun said that it might be of interest to report a similar case that he had observed at the Cooper Hospital Clinic a few years ago. The patient was a small child who was brought into the Hospital. The mother stated that she had noticed these white fleshlike growths on the child's upper right lid for about a month. The lesions seemed to be peculiar, and this diagnosis was considered. The patient was held and Dr. Shipman consulted about it, and he also suspected the diagnosis and had Dr. Zentmayer see the patient to confirm the diagnosis of molluscum contagiosum.

The child presented several small fleshlike semiglobular masses on the right upper lid, one of which was near the margin of the lid, and all had the typical umbilicated centers. There was an associated mild blepharitis, and also a chronic type of conjunctivitis. Dr. Zentmayer suggested the treatment of curettement and cauterizing the bases of the lesions with tincture of iodine. This was done and the condition cleared up remarkably well, the conjunctivitis subsiding within a few days.

Some pictures of this case were taken, and he showed them to illustrate the appearance of the lesions. It was interesting to him to learn of the corneal lesions associated with the cases Dr. Cowan reported. As far as he knew there were no corneal lesions in this case, although slit-lamp microscopy was not done.

Dr. T. H. Cowan thanked the commentator for his remarks, and, in closing, added that the diagnosis can be made very readily by the pathologic appearance, which is such that no other skin condition resembles it.

Grossly, molluscum contagiosum must be differentiated from the common wart, and probably from the sole sebaceous cyst, and also from an enlarged pore with a plug of sebaceous material.

OCULAR FINDINGS IN DIABETES MELLITUS CONTROLLED FOR 10 YEARS

DR. I. H. LEOPOLD reported on the examination of 100 diabetic patients who had been closely observed and treated for a period of over 10 years. All had been under the care of Dr. Russell Richardson at the Metabolic Clinic of the Hospital of the University of Pennsylvania. All patients had a high-carbohydrate, low-fat diet, with sufficient insulin to maintain a satisfactory blood-sugar level.

At the end of the 10-year period, all eyes were examined, chiefly for visual acuity, corneal wrinkles and pigmentation, signs of iritis and iris depigmentation, pupil reactions, tension, retinal

hemorrhages and exudates, sclerosis, optic atrophy, and neuritis.

Findings were compared to previously published statistics to evaluate therapy. Conclusions from analysis of data were as follows: Folds in Descemet's membranes were reduced by closely observed therapy; motility of ocular pigment was unaffected by therapy. The incidence of iritis, muscle palsies, optic neuritis and atrophy, and pupil reactions were uninfluenced by therapy. Lens changes of the senile type had the same incidence in the 10-year-treated group as in the nondiabetic group of the same age. Subcapsular flocculi still were seen in the diabetic in spite of therapy. Complicated cataracts were reduced in incidence in the 10-year-treated group. Retinal sclerosis had the same incidence in nondiabetics and treated diabetics. Deep punctate hemorrhages and waxy exudates increased in incidence with increasing duration of the diabetes and were slightly reduced by therapy. Reduction of visual acuity and increased superficial hemorrhages can be expected with increasing duration of diabetes in spite of therapy.

Although arteriosclerosis, hypertension, sepsis, hyperglycemia, and renal damage play an influencing role on deep retinal hemorrhages, not one is the sole etiologic factor.

Discussion. Dr. W. Zentmayer suggested that it might be of interest to know if there were any cases of hemianopia in the group reported. It may be recalled that some years ago Dr. de Schweinitz presented a paper on hemianopia in diabetes before the Section.

Dr. W. S. Reese asked whether Dr. Leopold had noticed any relationship between retinal disease and lens opacity in this series of cases.

Dr. W. Zentmayer then asked if Dr. Leopold was able to confirm the presence of aneurysmal dilatation in the veins in diabetic retinitis, as reported by O'Brien and Allen.

Dr. W. I. Lillie stated he wished to congratulate Dr. Leopold on his very excellent presentation of a well-studied group of diabetics. His curiosity was similar to that of Dr. Zentmayer's; namely, in the light of recent reports on venous sclerosis as the early change in diabetes, was this observed in any of Dr. Leopold's cases?

The flame-shaped hemorrhages and cotton-wool exudates are best explained by the associated arteriolar hypertension and are not significant of diabetes. The punctate hemorrhages and exudates are thromboses of the capillaries and venules, which are situated deeper than the retinal vascular layer.

He desired to know in what percentage venous changes had been observed.

Dr. T. H. Cowan commented that he was particularly interested in Dr. Leopold's findings in the different changes of the iris. He did not know whether he had missed it or whether Dr. Leopold had failed to give them the age group of the patients having changes of the posterior surface of the cornea and in the pigment of the iris. It would be very interesting to know whether that condition occurred more often in the younger groups of diabetics than it did in the nondiabetics; or, in the group of treated ones as compared with the nontreated ones. It is probably a normal senile process for pigment changes, absorption, and so forth, to take place. But, we do usually consider that those pigment changes in the iris are more likely to occur in diabetics.

We talk about that occasional case, in which upon opening the anterior chamber the aqueous becomes inky with pigment, and we immediately call the patient a diabetic.

He would like to know whether those

changes in the iris, and those of the posterior surface of the cornea, are pigment. It occurs very frequently in younger diabetics and is seen in the ordinary senile person.

Dr. F. H. Adler explained that such an interesting study was only of value if care was taken in interpreting the statistical findings. Since there are so many variables that cannot be controlled, considerable caution must be exercised in drawing conclusions, and he felt that Dr. Leopold had been very cautious in drawing his conclusions.

The outlook for the diabetic patient seems rather discouraging as a result of this study. Clinicians are now in a position to prolong the life of the diabetic by such measures as were used in these cases, and these studies have shown that treatment has very little influence on the retinal changes that occur in diabetics. The essential factor that produced these retinal changes seems to be the duration of the disease, and whether it is controlled or not makes very little difference.

If the clinician is going to make these patients live longer, we are going to see more patients visually incapacitated, unless some day we definitely discover the cause of the diabetic retinopathy.

Dr. I. H. Leopold answered that visual fields, were taken only in the cases in which there was any indication of optic atrophy or optic neuritis, or retrobulbar neuritis, and these were 24 in number. There were no cases of scotoma or hemianopia in any of these. The aneurysmal dilatations were looked for in all cases, and none were observed.

Another thing that was looked for was rubeosis diabetica irides. None were seen in the 10-year-treated diabetics.

The question was asked concerning the fullness and sclerosis of the retinal veins as a possible etiology of deep punctate hemorrhages. Observation of venous changes was attempted and it was found very difficult to evaluate the size of the retinal veins—especially of the third division of the vein, which division was stressed by Michaelson and Campbell in the transactions of the Ophthalmological Society of the United Kingdom of 1940. Because of the difficulty encountered in evaluating venous change, no reliable statistics can be stated for these 10-year-treated diabetics.

It was true that depigmentation was seen mostly in the older-age groups in both the 10-year-treated diabetics and in those reported by Waite and Beetham.

Dr. Reese asked whether there were any connections or relationships between lens changes and retinal changes. Unfortunately, Dr. Leopold had not yet analyzed the statistics with that in view.

Comparative notes on the superior and inferior oblique muscles

Dr. W. E. Krewson reported that the oblique muscles may be said to present many interesting contrasts. The superior oblique arises at the optic foramen and is the longest muscle in the orbit; the inferior oblique arises at the orbital foramen and is the shortest. The former has the longest tendon of all the muscles, but not a check ligament, while the latter has no tendon but does have the longest check ligament. The superior oblique has the most variable of insertions, usually on the vertical meridian, anterior to the vortex veins; the inferior oblique has the most constant of insertions, located on the horizontal meridian and posterior to the vortex veins.

The arc of contact in the case of the superior oblique is shorter than that for any of the other muscles; that for the inferior, the longest of all. The superior oblique has a contralateral innervation, and the inferior, an ipso- or bilateral representation. The superior acts as a

depressing muscle, the inferior as an elevator. Their respective actions increase as the eye is turned inward and decrease as the eye turns outward. The former acts as an intorter, the latter as an extorter. Both torsional actions increase as the eye is turned outward, and decrease as it is turned inward.

Both muscles are reputed to act as external rotators, which action increases as the eye turns outward and decreases as the eye is turned inward. In the case of the inferior oblique, however, there may still be a question as to whether it acts as an internal or an external rotator. The superior oblique is the second most frequently paralyzed muscle; the inferior is the most seldom involved, and then often accompanied by internal ophthalmoplegia.

Limitation of movement and vertical diplopia are greatest in the case of paralysis of the superior oblique when the eye is turned down and in, and in the case of the inferior oblique when the eye is turned up and in. Vertical diplopia is greater in paralysis of the inferior than of the superior oblique. The false image representing the superior muscle leans to the normal side; that of the inferior oblique leans to the affected side.

The phenomenon of misdirection of regenerating third-nerve fibers; the surgical correction

Dr. E. B. Spaeth presented moving pictures representing the various oculomotor defects that result from misdirection of regenerating third-nerve fibers. The point of outstanding interest in this case was the fact that the fibers that were normally destined for the inferior rectus terminated in the sphincter iridis. The fibers normally for the sphincter iridis enter by way of the short root to the ciliary ganglion from the nerve supply to the inferior oblique. The misdirection here could have been twofold; that is, fibers for the inferior oblique passing into the inferior rectus, or fibers for the inferior rectus going into the ciliary ganglion.

The paretic mydriases showed definite contraction in downward rotation; at the same time, the levator contracted, lifting the lid. This also was present with the contraction of the internal rectus, but to a much less degree. Otherwise, the lid was held in repose, in ptosis.

The surgery that was carried out was first applied to the paretic internal rectus, with the recession of the external rectus simultaneously. The levator was detached wholly from the tarsal plate. Several weeks later the completely paralytic ptosis was corrected by orbicularis transplants to the occipito-frontalis. Following this surgery the diplopia was lost wholly except in the extremes of elevation and depression.

If this continues as a disabling factor, it is planned to limit the arcs of contact for the vertically acting muscles in the good right eye, limiting thereby their excursion to correct this diplopia.

The surgery as carried out applies equally to the ptosis that one sees in the jaw-winking reflex.

Warren S. Reese,
Secretary.

NEW YORK SOCIETY FOR CLINICAL OPHTHALMOLOGY

October 6, 1941

Dr. James W. Smith, *presiding*.

Symposium on medico-legal ophthalmology

The physician in court

Dr. George I. Swetlow read a paper on this subject.

The ophthalmologist as an expert witness in compensation cases

Dr. Morris Davidson stated that the administration of justice in compensation

cases depends on honest and competent expert testimony. The qualification of experts by national qualifying boards and, since 1935, by the New York State Compensation Law creating a panel of specialists, operates quite successfully against the unqualified expert. Eye injuries in New York State amount to between 4,000 and 5,000 annually, and constitute about 3 percent of all injuries. The average compensation cost per eye case is, however, three times that of the average cost of all other permanent partial disability, hence the great importance of eye injuries in the administration. The principal handicap of the ophthalmologist as an expert witness results from the assumption, which the law imposes, of a normal visual acuity of 20/20, uncorrected or corrected, of a normal binocular depth perception and motor field, and normal visual fields as possessed by a worker on entering industry and before he meets with an injury. The ophthalmologist knows that about a sixth of the population has a subnormal visual apparatus and that about another sixth has a supernormal visual apparatus. In the absence of a universal system of periodic eye examinations, this assumption may undercompensate one sixth and overcompensate another sixth of injured eyes. The ophthalmologist cannot help the undercompensated one sixth under the law. He can, however, prevent miscarriage of justice, both for the claimant and insurance company, by following certain rules in the examination of compensation claimants. One rule is that of "20/20 or diagnosis." In the vast majority of cases a reason for a visual acuity of less than 20/20 exists. The second rule is "Seek and ye shall find" the cause of symptoms, even if the examination is negative and vision normal. Simulation and hysteria are rare, and their diagnosis should be made as a last resort only. The third rule is "Testis unus, testis nulus," that is: one sign does not make a disease entity nor an injury entity, and the etiologic differential diagnosis is facilitated by the recognition of injuries as syndromes. These rules protect the carrier as well as the claimant. Further safeguards are provided by a time limit of two weeks between an indirect eye trauma and a detachment of the retina. Every ophthalmologist can make a contribution toward the administration of justice, and expert testimony should not be left entirely in the hands of those who make a business of it. Industrial ophthalmology is a new field and deserves more recognition in our graduate schools of ophthalmology, and in our industrial-hygiene institutions.

Some medico-legal aspects of ophthalmology

Dr. Percy Fridenberg stressed the importance of completely accurate case histories for the legal protection of both the patient and the physician. In the matter of examination and treatment of the patient the law holds the physician responsible for a knowledge of the latest methods and instruments and for reasonable skill and intelligence in their use. The doctor is not responsible for the outcome of an operation, but he is required to exercise due care and diligence to the best of his ability.

In the matter of malpractice cases against physicians, the law requires definite proof that there has been negligence before they may be submitted to the jury. Ophthalmic practice often poses questions of grave responsibility requiring important and sometimes desperate decisions. The wise physician in such cases is the one who calls into consultation a capable colleague to help in the decision and to share the responsibility.

Discussion following symposium. The Honorable John Clark Knox stated that in his 23 years of experience he had heard all kinds of witnesses, good, bad,

and indifferent. In his opinion the outstanding qualifications of a good witness are (1) that he be honest, (2) that he know his subject matter, and (3) that he be prepared for the case in which he is to testify. Without these he does not properly serve his client.

He stated that he found it difficult to understand why two reasonably well-trained, honest, upright men cannot read an X-ray film and arrive approximately at the same result, and why the testimony of a doctor so often differs from that of the witness testifying for the other side.

He said it was highly important that the layman be advised about the prognosis of a certain injury, and cited a case in which he refused to make a decision because it was impossible to reconcile the testimony of the two physicians, both men of some experience, testifying on each side. In this case it was necessary to call in another doctor who was asked to examine the patient and report his findings, having been told nothing of the previous testimony. When called on the stand he gave his testimony in great detail and an account of what he believed would be the development of the case. The decision was finally made on his testimony. He remarked that a doctor was sometimes tempted to depart from conservatism in giving testimony, especially when irritated by the counsel on the other side.

He has advocated for many years the theory that in no case should the litigants be permitted to select their consultants. Instead they should be chosen by lot or by the judge, paid for by a central fund or by the state, and their sole interest should be to assist in the determination of what is just between two litigants. He also feels that there should be a limit to the number of experts to be called on each side. The jury should decide on the result of an injury after hearing a description of the injury by the physician treating the case and the opinion of one expert.

Dr. David J. Kaliski stated that in his opinion lay persons were not qualified to evaluate expert testimony. In the courts there frequently was discordant testimony on the same set of facts after examination of the patient. In liability cases the evaluation of the experts' testimony should not be left to a jury, but to a group or board sitting like a referee or master appointed by the court and consisting of two specialists and one general physician who would hear the testimony of the witnesses and evaluate it, and if necessary examine the patient and bring in a report to the court for submission to the jury, if there must be a jury, or for the guidance of the judge, if it is possible to dispense with the jury. A list of men designated as qualified by the Medical Society as in Workmen's Compensation should be available to the court for appointment as experts by either side.

The purpose of the Workmen's Compensation Law is to avoid strict legal evidential procedure and trial. The referees are usually laymen. Their function is to evaluate the condition of the patient, to determine the question of functional disability, and causal relationship. He said the medical witness was usually given wide latitude by the referee. He is given an opportunity to explain what he means by technical terms and is not frequently given a long-winded hypothetical question to answer.

There are two kinds of witnesses, the ordinary physician witness and the so-called expert witness. The general practitioner should, wherever possible, confine himself to ordinary testimony and not try to qualify as an expert by expressing an expert opinion unless he is indeed so qualified.

Under the Workmen's Compensation

Law a man cannot treat or testify as a specialist unless he is so qualified by the medical society. At the present time the qualifications set by the societies are as high as those set by the National Examining Boards in the various specialties, and, in addition to a diploma, a doctor wishing the designation of specialist in a surgical specialty must prove that he has had adequate surgical experience. This he considered a step in advance and a protection to the public.

There are four sets of experts at the disposal of the Department of Labor. 1. The physicians of the Department of Labor, usually not experts with one or two exceptions. 2. In addition to these there is a set of especially qualified physicians put at the disposal of the Department of Labor under the Workmen's Compensation Law, to give an opinion on the facts, causal relationship, and the degree of disability. They are appointed by the medical societies. In 1940 the Department of Labor made restricted use of these experts. In cases of varying testimony they may be called in. 3. Under the Workmen's Compensation Law three experts in chest diseases (silicosis) are employed by the Department of Labor to examine and advise the referees on all claims for compensation as a result of exposure to various forms of dust, and so forth. 4. The specialists who appear for the claimant or the carrier or employer.

In referring to a statement by Judge Knox about why two doctors cannot agree in reading an X-ray plate, or on other facts or conditions, he said that it was not difficult to explain varying opinions from a medical standpoint and that was another reason why a board of medical experts should be set up to evaluate expert testimony. Doctors sometimes disagree. Two doctors may ascertain that a patient has an epididymitis. The patient claims it is a result of an accident. One doctor says it can be, the other says it cannot be the result of trauma. Both are honest but have different views as to the etiology of this condition and its relation to the alleged accident. The factors of litigation are such that on the whole it would be better for physicians themselves to evaluate expert testimony and render a decision to the court on the question at issue.

Dr. P. Fridenberg asked how far a doctor is liable for the nurse employed in his office.

Dr. F. Theodore asked whether the doctor is responsible if anything happens in the domain of anesthesia, when a nurse anesthetist is employed.

Dr. G. Swetlow stated that the nurse employed by a doctor is his agent and he therefore stands back of any errors she commits. If the nurse anesthetist is the agent of the doctor, he is liable. If she is supplied by the hospital, she and the hospital are liable unless the doctor interferes in the giving of the anesthesia.

He said that he was always suspicious of a diagnosis of hysteria. Few ophthalmologists know how to differentiate hysteria from simulation. Not 1 percent of all ophthalmologists and 5 percent of practicing physicians know how to make a diagnosis of hysteria. Too often when nothing organic is found, a diagnosis of hysteria is made; whereas you might be dealing with variations of organic diseases or with new diseases.

As to the matter of questions concerning payment, Dr. Swetlow said that the witness answers yes if he is being paid, and also states the sum, if asked, without hesitation.

Dr. M. Davidson challenged the statement of Dr. Kaliski in which he implied that the County Medical Society had better methods of qualifying specialists than the National Board of Examiners, and

pointed out that in ophthalmology, candidates were subjected to a rigid oral, written, and practical examination.

In answer to a statement made by Dr. M. Mintz that a diagnosis of malingering was frequently made without malingering tests having been given, he stated that a competent ophthalmologist should not worry about simulation. He can vary his techniques in many ways to rule it out. A deliberate simulator generally resorts to subnormal vision in both eyes, then there is no way of determining the vision. This, he said, was very rare, he having seen only about six cases over a period of 12 years. He also stated that he had known cases in which a diagnosis of simulation and hysteria had been made in which intraocular foreign bodies, luetic fundus lesions, and interstitial keratitis had been overlooked. He himself never makes a diagnosis of hysteria, referring any suspected cases to a neuro-psychiatrist.

Dr. A. Kornzweig asked what the time limit was between the time of injury and the occurrence of a detachment.

Dr. Davidson said, on the basis of an analysis of a large number of cases, that in all bona fide cases trouble was reported generally in less than a week and that detachment was observed in two weeks. This applies, of course, only to indirect traumatic detachments.

Dr. P. Fridenberg said that with regard to hysteria versus simulation, he agreed with the statement made by Dr. Swetlow as to usual tests. Hysteria patients sought refuge by "Freudian escape" in blindness and were not conscious of concealing. The simulator wants to appear blind. He chooses monocular blindness 9 times out of 10 because binocular blindness would make him a nuisance to his people. Simulated binocular blindness can usually be detected simply by carelessly asking the patient to take another chair or walk into the next room. The psychology of the two conditions is one of direct opposites and this applies to diagnosis and possible treatment, as well. With the new apparatus for projecting test letters of irregularly varying size, changing the illumination, using polaroid glass to shut out one or other eye of the patient without his knowledge, the simulator has practically no chance to escape detection.

Sidney A. Fox,
Secretary.

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PERSONAL RECOLLECTIONS OF DR. EDWARD JACKSON

My first recollection of Dr. Jackson was at the forty-seventh annual meeting of the American Ophthalmological Society in July, 1911, at the Fort Griswold Hotel in New London, at which time I was a sophomore in medical school. I happened to be in New London with my father that summer, so he suggested that I might enjoy meeting some of the members of the Society. Accordingly, I listened to parts of a few papers, of which I understood almost nothing, but was interested in watching the conduct of the meeting by Dr. Gruening, president, and Dr. Sweet, secretary. After the session my father presented me to a number of the members with some of whom I became well acquainted in later years. Among them I especially remember Drs. Jackson, Carmalt, Risley, Timberman, Parker, Lancaster, Davis, and Callan.

Some years passed before my acquaintance with Dr. Jackson progressed beyond the point of polite recognition at occasional meetings, but it must be said that if one attended any meeting of ophthalmologists he was more than likely to find Dr. Jackson there, because he was always a faithful and contributing member to medical gatherings.

One day in 1923, for some to me unknown reason, he approached me at a medical gathering and asked me if I

would care to have some connection with the American Journal of Ophthalmology. Upon my assuring him that nothing would please me more, he suggested that during the coming summer I might try my hand at writing an editorial. Had I known then the difficulty encountered by editors in obtaining editorials, even from the staffs of their own journals, I might not have felt as complimented as I did! However, Dr. Jackson must have seen some good in the unimportant brain child that, with much sweating of the brow, I produced in that first summer, for soon thereafter he suggested that I take over the conduct of the "Society Proceedings" and the "News Items," as well as contribute an editorial now and then. This was the beginning of an association that soon became close and continued until his death.

There were usually at least two meetings of the Journal board each year, at which Dr. Jackson as editor-in-chief and president of the Ophthalmic Publishing Company was the directing and moving spirit. He did not like to be hurried at these deliberations. Sometimes the younger members would be rather impatient to terminate the session, especially if the day was a fine one and the green grass and trees beckoned to the golf enthusiast. But these meetings were undoubtedly very enjoyable to Dr. Jackson. He wanted to discuss not only matters of Journal business but the broader aspects of relationships with the profession. He always had the welfare of doctors and people in general close to his heart, and would talk on their problems at length.

No one who did not work with him can fully appreciate how much the American Journal of Ophthalmology meant to him. We had many a long walk together during which he would discuss the future of his erstwhile baby. He thought that the editors should be in close touch with the profession, which meant regular attendance at meetings as well as taking an active part in them.

When he decided that he must pass on the burden of chief editorship to someone else, he gave the matter deep thought. At this time it became evident that the Ophthalmic Publishing Company could no longer afford to publish the Year Book, because it had always been done at a loss of several thousand dollars, and no method of continuing it was found available, a matter of great regret to Dr. Jackson. He selected the former efficient editor of the Year Book, Dr. Crisp, to succeed him as editor-in-chief. Dr. Jackson continued as president of the Company and an active contributor to the editorial pages.

On the occasions of Dr. Jackson's visits to Saint Louis for meetings he was a frequent visitor in our house. He soon became a familiar figure to my wife and boys and thereafter when we met he never failed to inquire about each of them by name. A striking characteristic of him was his amazing information on many subjects. Whether it was in the art gallery or Shaw's Garden, he was entirely at home, showing a familiarity with paintings and plants that equalled that of the directors of these institutions, who sometimes accompanied us on our excursions. Whenever there was a spare moment at a meeting we headed for an art gallery. I believe that together we tramped the floors of almost every art gallery in the country in the 20 years of our close association, and what little I know of art is due to his illuminating comments. And when I say tramp, I mean tramp, for he was one of the most indefatigable walkers I have ever known. Even to his last days he could walk at high speed for hours on end, carrying on long after I was ready to call it a day. Often he would walk alone. He seemed to prefer to stop at smaller

hotels rather than the usual choice of ophthalmologists when at such places as Atlantic City and New York; I often thought that this was so that he might have the pleasure of the walk to and from the meeting places.

Soon after assuming the Journal chief editorship I became head of the Department of Ophthalmology at Washington University. Quite unexpectedly, Dr. Jackson appeared one day in Saint Louis. He came to my office in the morning, visited the Journal office where the business of the Journal management was conducted, and then spent the afternoon with me at the Medical School. He did not explain the reason for his visit until we were at home that evening, when he turned to my wife and said, "Mrs. Post, I just came to Saint Louis to find out whether Dr. Post (he was always formal although in his last years I did persuade him occasionally to use my first name) had taken on too much, but I have watched him all day and believe that he has systematized his work so that he is safe, so now I am going home." This seemed to show two things: interest in the welfare of the Journal and in a friend. This action typified the man; it needs no comment.

His penetrating knowledge, his deep wisdom, his piercing but kindly eyes are some of our memories of him. The figure that he cut meant nothing to him. He was interested only in vital matters. Fashions might come and go, but wing collar and black tie and old black felt hat or gray cap were always in vogue for him. It is fine to know those to whom trivialities are trivialities. One might well epitomize his life in the phrase "Esse quam videri," "To be, rather than to seem."

Lawrence T. Post.

I knew Dr. Jackson in Philadelphia in 1900 during a meeting of the American Medical Association, to which I had been invited as a guest of the Section of Ophthalmology. He seemed a little aloof at first, but we became friendly. When I began publishing the "Anales de Oftalmologia," in Mexico, in 1898, he wrote me congratulating me on the issuing and presentation of the Journal.

For many years after we kept in touch, and he never failed to write in the Annals of Ophthalmology and in his small "Ophthalmic index" about my work and the "Anales" progress. Unfortunately these had to be discontinued after 17 years of publication because of the revolutionary war in Mexico.

When I came to this country, in 1916, he helped me as much as he could. He proposed then to merge the Anales de Oftalmologia with the American Journal of Ophthalmology. I accepted and became an editor of the Journal.

We always met at the meetings of the several ophthalmological societies. His kindness, his modesty, and his desire to help others were to me an inspiration for my work. He invited me to read a paper on gonioscopy in Denver, for the postgraduate meetings which he sponsored and of which he was the moving spirit. I had then the opportunity to see him in his own surroundings, his office and his home, and to see the simplicity of his life. The devotion with which all, students and colleagues, surrounded him was an eloquent tribute to his qualities of leadership.

For many years before his death he was at the forefront of American ophthalmology. His papers were of the highest scientific value and contained many original ideas. He was besides a gifted writer and an inexhaustible medical commentator. His personality was reflected to great advantage in the numerous editorials he wrote for the Journal, all showing his critical mind, his trained pen,

and his vast and brilliant erudition.

I was very glad to contribute a paper to the special Volume in celebration of his seventieth birthday, a tribute of my high esteem for the man and the ophthalmologist. He belonged to the generation of American ophthalmologists which, with de Schweinitz, Risley, Casey Wood, and others, contributed to placing ophthalmology on a broad scientific basis and to encourage research. His book on refraction is classical and ushered in a new era in the field of refraction in America, which was far in advance of the work done in European countries at that time.

In closing I wish to emphasize his qualities as a gentleman and a scholar and his constant desire to help others to overcome life and professional difficulties. He had many students who followed his teachings. Not the least of his merits was his devotion to teaching. Even at the end of his life, he remained in harness, and gave instruction at the Academy of Ophthalmology and Otolaryngology in Chicago, two weeks before his death.

Manuel Uribe Troncoso.

As the career of Dr. Edward Jackson is brought to a close, one looks backward over the years of his time, nearly a century, with more than 60 years of medical practice, to speculate on the qualities that so endeared him to a wide circle of friends and that made it possible for him to accomplish so much in the field of his chosen profession.

The great surge in medical education and in surgical achievement in this country swelled to full tide during the two quarter-centuries of his teaching activity. About the time that Dr. Jackson seriously took up the practice of ophthalmology, Clifford Allbutt had just published his book on "The ophthalmoscope" and Donders's classic monographs on refraction were becoming known. There were few textbooks on ophthalmology available, and fewer current journals. With an adequate educational background in engineering, Dr. Jackson was particularly well fitted to take up ophthalmology, with its comparatively new scientific stepchild, physiologic optics, at a time when the application of that science to clinical practice was just beginning to unfold.

Dr. Jackson was a wide reader, a facile writer, and a born teacher. These talents were the outstanding abilities of the man as I knew him. A successful teacher must have a deep interest in young students and in doctors beginning their practice. With Dr. Jackson this interest was genuine and personal. His teaching was informative, inspirational, and demonstrative rather than pedantic. He could quickly perceive the value of a clinical procedure, a discovery in the laboratory, or a principle of optical application announced by a colleague, and he would expound it and interpret it in simple, clear language. He oftentimes made clear for his students the deeper significance of discoveries in pure science, especially in mathematics, embryology, and physiologic chemistry. His clearness of thought, his analytical mind, and his facility of expression made him a successful teacher.

In his later years I was privileged to sit with Dr. Jackson on committees and was associated with him in a minor capacity on the business staff of the American Journal of Ophthalmology. His natural leadership was evident in that, always, he was asked to be chairman of the committee, not entirely on the basis of seniority but because he was a proved director of activities to whom we could look for the best way to arrive at conclusions in the most amicable manner. Differences of opinion were weighed by him as chairman, and while favoring conciliation he

was not one who would compromise a principle. Prolonged, heated controversies never occurred in his committees nor polemics in his writings. He was tolerant and cautious in his affairs with men, but he had terminal facilities; he could activate ideas and accomplish projects.

These were the characteristics of Dr. Jackson as I knew him. They are the features that are worn by distinguished men. His mind in his later years was attuned to the wavelength of modern progress. While he loved the old songs, he also learned the new ones; his reminiscences were historic and used to point out an epoch in evolution of medical practice. For many years we have been conscious of his presence and fully cognizant of his leadership among us, and we have felt the contagious warmth of his personality. We have no way of telling how much we will miss him. We only know that we will.

W. L. BENEDICT.

With the death of Edward Jackson, the West has lost a great champion. Reared in the East, by final choice a Westerner, Edward Jackson became a beloved tradition of that West. Others, in eloquent words, will describe his many contributions to the science of ophthalmology and his untiring efforts as editor of the American Journal of Ophthalmology, but I like best to think of him as a guiding spirit in the development of western ophthalmology.

His yearly presence at the meeting of the Pacific Coast Oto-Ophthalmological Society was a factor in the growth of that organization into one of the nation's outstanding regional societies. His discussion of papers, together with his learned presentations, was always a stimulation particularly for the younger men for whom he always had an interest. Often the younger men would come to Dr. Jackson for advice and they always found his counsel wise. His interest in youth was further demonstrated by his study of the visual difficulties of the school age and his constant effort to remedy the factors interfering with the comfortable use of the eyes in school.

He had a warm heart toward his fellow men and was ever ready with a kindly word. Thus on the occasion of a discussion of a paper on aniseikonia he said: "I am afraid that for once I am in the minority. I think that when you come to read the paper you will see that it is a very good account of recent investigation and advances. It's a better paper than you might think." Again at the presentation, by a younger man, of a new operation for ptosis, he said: "I can remember, a good many years ago, feeling that the new Motais operation was a very distinct advance—the operation suggested seems to me to be an equally great advance over the Motais."

He always studied and tried to explain the simple phenomena observed in nature. During a discussion he remarked: "This morning I looked out of the window where I could see the lights in the other buildings. All the lights looked steady but one was changing. It broke up into more than one light and changed in position. I found it was the reflection of a light I could not see. It was the reflection from the water in the swimming pool that was changing."

Aside from his interest in the scientific world, Edward Jackson loved to commune with nature. Whenever he attended a meeting at Del Monte he could always be found out on the grounds before breakfast, studying the birds, flowers, and trees. Often during his discussion he would mention some observation made during his early morning walk.

So, in addition to knowing him as an

ophthalmologist, a scientist, and a masterful teacher, we have had the privilege of learning to know Edward Jackson as a kindly, humane sort of man who was our friend and champion. The Pacific Coast ophthalmologists will miss him sorely.

Frederick C. Cordes.

To all of us who knew Dr. Edward Jackson, his death comes as a shock. We looked up to him as a leader in ophthalmology. Perhaps no other physician in our day was more the exemplification of high ethical standards, a scientific attitude, and true leadership for younger men. Furthermore, his friendliness and kindness endeared him to all of us. When I think of Dr. Jackson, the recurring thought is his intense interest in ophthalmology, and his willingness to advise those of us who were younger, but also interested in our specialty.

C. S. O'Brien.

BOOK NOTICES

MANUÁL PRÁCTICO DE OFTALMOLOGÍA. By Raúl Argañaraz, M.D., Chief of Ophthalmology, Faculty of Medicine, Buenos Aires. Third edition. Published by El Ateneo, Buenos Aires, 1942. Paper bound, 817 pages, 695 illustrations.

The manual represents the compilation of clinical lectures as given to students of ophthalmology at the University of Buenos Aires and is intended as a guide for students in this field and for medical practitioners. The author emphasizes in the introduction his dislike for the need of taking notes during lectures and suggests this volume may obviate that need.

The text is divided into 24 chapters. Half of these consider diseases of individual structures of the eye, as the lids, conjunctiva, and so forth, while the remainder are concerned with the following subjects: Congenital anomalies, Examination of the interior of the eye, Diseases of the nervous system and other organs by pupillary signs, Ocular trauma, Disturbances of the motor apparatus, Refraction of the eye, Amblyopia and amaurosis, Intraocular tumors, and Ocular allergy. Each chapter is introduced with a brief consideration of the anatomy, physiology, and physiopathology of the ocular structure under discussion. The classification, clinical manifestations, differential diagnosis, and medical and surgical treatment of ocular diseases are presented. The pages given to methods of examination of ocular functions and their derangements, and the interpretation of the results of such examinations are particularly well presented and instructive.

The work is very readable and well organized, which compensates for the rather inadequate index to its pages. Many of the illustrations, which number 695, are clinical photographs and many of the drawings are in color. In general, these illustrations are well reproduced, although occasionally they are limited in number and in size.

Because of the author's ambition to include in a single volume of standard size such an encompassing consideration of ophthalmology in general, any extensive detail was impossible to achieve. No chapter, therefore, is fully complete in the discussion of its subject. In fact, the author points out that he has not attempted the weary task of presenting exhaustive scientific discussions of ocular problems, but rather has elected the indispensable fundamentals of ophthalmology. The manual admirably accomplishes this aim and presents to the student and practitioner a clear and concise guide to the examination, diagnosis, and treatment of functions and diseases of the eye.

R. A. Westsmith.

COLLECTED REPRINTS FROM THE WILMER OPHTHALMOLOGICAL INSTITUTE OF THE JOHNS HOPKINS UNIVERSITY AND HOSPITAL, Volume VI. July, 1938, to July, 1942. Issued Baltimore, Md., September, 1942.

The title of this volume indicates the nature of its contents. The subject matter ranges all the way from clinical reports to detailed studies on fundamental problems and one is impressed with the volume of work coming from this one center of ophthalmology.

In all there are 68 papers, written singly or jointly by 34 authors. A great many of the papers appear alone on unrelated subjects. Many others, however, compose a series and offer a rather complete study. There are five articles on ocular tuberculosis by Woods and Burky. Moore and Woods have a long critical review on "The pathology and pathogenesis of syphilitic primary optic atrophy." This is accompanied by an excellent bibliography. Friedenwald contributes several papers on glaucoma research.

It would be unfair to point out any single work as being especially noteworthy, for this would be determined by the reader's interest.

H. Rommel Hildreth.

TRANSACTIONS OF THE AMERICAN ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY. The Forty-sixth Annual Meeting, Chicago, October 19th to 23d, 1941. Price $4.00.

Although similar in format and general content to the preceding issues, the 1942 volume of the Transactions marks a definite change in policy. All the material in this volume has been previously published in the issues of the new series bi-monthly Transactions, the present bound volume being made up of the collected, individual issues of September, October, November, December of 1941, and of January, February, March, April, May, June, July, and August of 1942. In it are found the proceedings of the 1941 convention of the Academy held in Chicago in October of that year.

As in the past, this chiefly consists of the addresses of the officers and the guest of honor, the papers read at the scientific sessions, the motion-picture programs, the roster of members, the reports of the Council and Council Committees, and the official business meeting of the Academy. In addition it contains some material not found in the previous volumes, this being chiefly editorial comments and announcements of the semi-monthly issues.

As the bi-monthly issues of the Transaction are sent to all members of the Academy, the bound volume is furnished to members at an additional cost. It is available to libraries, and to those members who wish to continue their set of the Transactions in a uniform binding.

T. E. Sanders.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is mentioned only in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy, embryology, and comparative ophthalmology

3

PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

Wald, G., Harper, P. V., Jr., Goodman, H. C., and Krieger, H. P. **Respiratory effects upon the visual threshold.** Jour. Gen. Physiology, 1942, v. 25, July 20, p. 891.

In a completely dark-adapted individual the absolute threshold of vision remains constant indefinitely within narrow limits. The photochemical systems of the receptors are at rest; and this state is not disturbed appreciably by the minimal exposures to light needed to determine the threshold. Under such circumstances various types of physiologic stress cause marked changes in threshold which must originate at levels central to the photochemical system itself. In this sense the threshold of the dark-adapted eye is an indicator of central nervous imbalance. The present paper is concerned with the effects upon the threshold of low oxygen tensions, applied gradually or suddenly, and of short and long duration; and of changes in the rate of breathing and in the composition of the inspired gases. All thresholds have been measured in the periphery of the dark-adapted eye and involve the function of the rod apparatus alone.

Breathing room air of 32 to 36 percent oxygen at about double the normal rate causes the visual threshold to fall to approximately half the normal value within 5 to 10 minutes. Normal or rapid breathing of 2-percent carbon dioxide causes no change in the threshold; with 5-percent carbon dioxide the threshold is approximately doubled. Breathing 10-percent oxygen at the normal rate also approximately doubles the threshold. This effect is compensated in part by rapid breathing. When 10-percent oxygen is breathed at twice the normal rate the threshold usually falls at first, then slowly rises to above normal levels. Ralph W. Danielson.

4

OCULAR MOVEMENTS

Burri, Clara. **Process of learning simultaneous binocular vision.** Arch. of Ophth., 1942, v. 28, Aug., p. 235. (See

Section 3, Physiologic optics, refraction, and color vision.)

Jones, H. E., and Morgan, D. H. **Twin similarities in eye-movement patterns.** Jour. of Heredity, 1942, v. 33, May, p. 167.

A series of shifts and pauses characterizes the reading act. Such ocular behavior was photographed with an ophthalmograph on series of fraternal twins, identical twins, and artificial pairs (nonrelated subjects).

The authors' findings indicate that individual differences in eye movements are more complex than the habit or training concept implies. Reactions from existing degrees of intelligence and education express themselves in the movement patterns. Similarity of eye-movement patterns is greater in identical than in fraternal twins. Marked differences in specific aspects of eye movements were found in artificial pairs of students whose ability was much alike. (Tables, ophthalmograph records.) F. M. Crage.

Loy, A. W. **A study of depth perception and fusion in relation to the treatment of strabismus.** United States Naval Med. Bull., 1942, v. 40, July, p. 694.

This paper is a discussion of the physiology of fusion, supplemented by case reports. Ralph W. Danielson.

5

CONJUNCTIVA

Arnold, R., and Whildin, J. **Rhinosporidiosis of the conjunctiva.** Amer. Jour. Ophth., 1942, v. 25, Oct., pp. 1227-1230. (One photograph, 3 photomicrographs, references.)

Last, Jeremiah. **Oculoglandular tularemia.** Med. Bull. Veterans' Administration, 1942, v. 18, April, p. 429.

The author reports a typical case of oculoglandular tularemia in a Missouri farmer. The interesting feature is the history that the patient apparently became infected by blood which had spurted into his eye while dehorning a steer. Ralph W. Danielson.

Roetth, A. F. de. **Epidemic keratoconjunctivitis.** Northwest Med., 1942, v. 96, Sept., p. 246.

The author observed ten cases of this disease within ten weeks. Clinically there was swelling of the lids, and acute conjunctivitis with chemosis. There was papillary unevenness in a red conjunctiva. Numerous small follicles were present in the fornices, and there was slight mucoserous discharge.

Eight to 12 days after the disease started, when the conjunctivitis was definitely subsiding and the lid edema gone, eight patients developed superficial punctate keratitis. Three to thirty tiny, slightly elevated infiltrates were present in the epithelium and immediately under it. The keratitis remained unchanged for several weeks, then clearing started, and in one month after onset of the keratitis the cornea became normal in all but three cases. The vision in one case was reduced to 20/40, partial confluence of the lesions being observed.

In all cases the disease started in one eye only. The patients' ages varied from 24 to 65 years. Staphylococcus, xerosis, pneumobacillus, and diphtheroid bacilli were found in cultures and smears. No inclusion bodies were found. The bacteriologic and serologic findings did not disclose the nature of the disease. The consensus of the modern authors is that this disease is caused by an unknown virus.

In six cases of the author's there was some kind of trauma of the cornea or

conjunctiva eight to 11 days before the onset of the conjunctivitis. No specific treatment is known for the disease. Local treatment failed to show results. Sulfadiazine rapidly diminished the conjunctivitis but did not prevent the keratitis. F. M. Crage.

6

CORNEA AND SCLERA

Ellis, O. H. **Nodular keratitis.** Amer. Jour. Ophth., 1942, v. 25, Oct., pp. 1224-1226. (One figure, references.)

Gresser, E. B., and Thomas, E. W. **Superficial punctate keratitis in Milian's erythema of the ninth day.** Arch. of Ophth., 1942, v. 28, Aug., p. 245.

Milian describes an acute illness with fever, rash, pharyngitis, and cervical adenitis appearing on the seventh to the twelfth day after injections of trivalent arsenic compounds. Gresser and Thomas report four cases of superficial punctate keratitis occurring as a part of Milian's erythema. The symptoms were redness of the eyes, photophobia, blurring, lacrimation, and a mild sensation of a foreign body. The entire area of corneal epithelium had a diffusely scattered, superficial, finely punctate graying. Apparently the individual lesions were edematous cells rather than erosions. The acute phase lasted from two to four weeks and the attack ended in complete recovery. John C. Long.

Kinsey, V. E., and Cogan, D. G. **The cornea. 3. Hydration properties of excised corneal pieces.** Arch. of Ophth., 1942, v. 28, Aug., p. 272.

Pieces of cat cornea were immersed in various solutions and the amount of swelling thus produced was measured. The cornea swelled in all of the aqueous solutions. The degree of swelling could not be correlated with the osmotic pressure of the solutions, valence of the electrolytes, or the nature of the ions. Nonelectrolytic solutions have practically the same effect on the cornea as distilled water. The isoelectric point as determined by the minimum amount of swelling is p_H 4.3. (10 graphs.)

John C. Long.

Kinsey, V. E., and Cogan, D.G. **The cornea. 4. Hydration properties of the whole cornea.** Arch. of Ophth., 1942, v. 28, Sept., p. 449.

The fluids which normally bathe the cornea produce no change in its size, but when isolated pieces of cornea are placed in these same fluids great swelling occurs. Experiments on whole cat-corneas indicate that the fluid content of the cornea is largely controlled by the differences in osmotic pressure between the inside and the outside of the cornea. The epithelium and endothelium make the differences in osmotic pressure possible, as both membranes are essentially impermeable to sodium chloride. If either the epithelium or the endothelium is damaged, considerable swelling occurs when the cornea is immersed in a sodium-chloride solution. Experimentally increased intraocular pressure tends to oppose corneal swelling brought on by disturbed osmotic relationships, but it does not appear that physiologic intraocular pressures have an appreciable effect in preventing normal turgescence.

John C. Long.

Rochat, G. E. **The corneal changes in dysostosis multiplex (gargoylism, Hurler's disease).** Ophthalmologica, 1942, v. 103, June, p. 353.

The patient with dysostosis multiplex described by Werdenburg in the same journal in 1940 died at the age of six years. Histologic preparations of the

cornea revealed the cause of the opacities seen in this membrane. They resulted from clefts in Bowman's membrane which were filled with large lipoid-bearing cells.

F. Herbert Haessler.

Roetth, A. F. de. **Epidemic keratoconjunctivitis.** Northwest Med., 1942, v. v. 96, Sept., p. 246. (See Section 5. Conjunctiva.)

Sorsby, A., and Hamburger, R. **The etiology of phlyctenular ophthalmia.** Trans. Ophth. Soc. United Kingdom, 1941, v. 61, pp. 257-264. (See Amer. Jour. Ophth., 1942, v. 25, Sept., p. 1133.)

Waldman, Joseph. **White rings in the cornea (Coats).** Amer. Jour. Ophth., 1942, v. 25, Nov., pp. 1362-1365. (One illustration, references.)

7

UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Ascher, K. W. **Aqueous veins. 1. Physiologic importance of the visible elimination of intraocular fluid.** Amer. Jour. Ophth., 1942, v. 25, Oct., pp. 1174-1209. **2. Local pharmacologic effects on aqueous veins. 3. Glaucoma and aqueous veins.** Idem, Nov., pp. 1301-1315.

Carrasquillo, H. F. **Uveitis with poliosis, vitiligo, alopecia and dysacousia (Vogt-Koyanagi syndrome).** Arch. of Ophth., 1942, v. 28, Sept., p. 385.

This is a very comprehensive review of the known facts and theories concerning this disease. The Vogt-Koyanagi syndrome is a recognized clinical entity characterized by severe bilateral uveitis accompanied by canities, white areas in the skin, and falling of the hair, and is often associated with disturbances of hearing. It has a protracted course, responds poorly to treatment, and usually ends in partial or complete blindness. Similarities to sympathetic ophthalmia and Harada's disease are pointed out. The author states that a neuropathic factor of sympathetic activity is operative in the production of the syndrome but that the manner in which this factor is activated is still unknown.

There is a tabulation of 29 cases from the literature and Carrasquillo presents one personal case in great detail. The patient was a 36-year-old white Puerto Rican man who was seen six months after onset of the disease. When examined he showed patches of canities in diffuse form, generalized thinning of the hair, rather symmetrical areas of white skin, and partial deafness. The eyes showed keratitic precipitates, iris atrophy, posterior synechiae, and complicated cataracts. The tuberculin test was positive as was also a serologic test for syphilis. After approximately twenty months from the time of onset the vision had improved to 20/300 in the right eye and 20/400 in the left. The case is well illustrated with photographs and drawings. John C. Long.

Mohoney, J. B., Morgan, M. W., Jr., Olmsted, J. M. D., and Wagman, I. **The pathway of sympathetic nerves to the ciliary muscles in the eye.** Amer. Jour. Physiology, 1942, v. 135, Feb. 1, p. 759.

The authors describe their experimental work in determining the pathway of sympathetic nerves to the ciliary muscles in the eye of the dog, cat, rabbit, and rhesus monkey.

Theodore M. Shapira.

Rothbard, S., and Angevine, D. M. **Chronic choroiditis produced with streptococcus viridans and streptococ-**

cus hemolyticus in normal and in immunized rabbits. Jour. Infectious Dis., 1942, v. 70, May-June, p. 201.

Various methods of producing experimental uveitis are given. Numerous authors are quoted and their results are briefly described.

The authors' experiments were carried out on albino rabbits. It was demonstrated that when homologous cultures of streptococcus viridans and hemolyticus were used greater susceptibility to the development of chronic choroiditis was found in rabbits which had previously been immunized intravenously or intracutaneously.

F. M. Crage.

Sugar, H. S. **Anatomic factors that influence the depth of the anterior chamber; their significance.** Amer. Jour. Ophth., 1942, v. 25, Nov., pp. 1341-1351. (5 tables, 2 graphs, references.)

Troncoso, M. U. **The intrascleral vascular plexus and its relations to the aqueous outflow.** Amer. Jour. Ophth., 1942, v. 25, Oct., pp. 1153-1162. (10 illustrations, bibliography.)

Weld, C. B., Feindel, W. H., and Davson, H. **Penetration of sugars into aqueous humor.** Amer. Jour. Physiology, 1942, v. 137, Sept. 1, p. 421.

An investigation on dogs, comparing the penetrating properties of xylose, glucose, sucrose, and raffinose, shows such properties are inversely related to the size of the molecule.

Theodore M. Shapira.

8

GLAUCOMA AND OCULAR TENSION

Ascher, K. W. **Aqueous veins. 1. Physiologic importance of the visible elimination of intraocular fluid.** Amer. Jour. Ophth., 1942, v. 25, Nov., pp. 1174-1209. **2. Local pharmacologic effects on aqueous veins. 3. Glaucoma and aqueous veins.** Idem, Nov., pp. 1301-1315. (22 figures, 5 tables, 3 charts, bibliography.)

Kronfeld, P. C., McGarry, H. I., and Smith, H. E. **Gonioscopic studies on the canal of Schlemm.** Amer. Jour. Ophth., 1942, v. 25, Oct., pp. 1163-1170. (One table, references.)

Sugar, H. S. **Anatomic factors that influence the depth of the anterior chamber; their significance.** Amer. Jour. Ophth., 1942, v. 25, Nov., pp. 1341-1351. (5 tables, 2 graphs, references.)

Sugar, H. S. **A practical method of measuring the depth of the anterior chamber.** Amer. Jour. Ophth., 1942, v. 25, Oct., pp. 1230-1233. (3 illustrations, 1 table, references.)

Sugar, H. S. **Evidence for circulation of the aqueous and its relation to glaucoma.** Arch. of Ophth., 1942, v. 28, Aug., p. 315.

The three hypothetical methods by which aqueous may be formed are filtration, dialysis, and secretion. The controversy as to which of these processes plays a stellar role has been settled by Friedenwald, who concludes that "no unitary answer can be given to these questions and that thermodynamic and osmotic forces, hydrostatic and finally vital forces enter into the picture."

There is considerable experimental and clinical evidence to show that there is an active circulation of the aqueous. Foreign substances introduced into the vitreous soon appear in the aqueous. The movement of radioactive isotopes of sodium, chlorine and phosphorus

in the eye indicates an active circulation. Experimental hindrance to the outflow of aqueous from the anterior chamber leads to an increase in intraocular tension. Troncoso has shown that there is dilution by aqueous of the blood in the episcleral veins. Clinical evidence of an aqueous circulation is afforded by the appearance in the anterior chamber of tumor and inflammatory cells that have originated behind the iris. The author illustrates at considerable length the evidence for aqueous circulation as seen in various types of obstructive glaucoma. Glaucoma operations are based on the establishment of substitute channels for the drainage of aqueous. This indicates that a through and through circulation of the aqueous probably exists.

The author discusses the phylogenetic, experimental, and clinical data that demonstrate reabsorption of the aqueous through the canal of Schlemm and its ultimate drainage into the episcleral vessels.

Sugar has devised an etiologic classification of glaucoma based upon the various factors that influence free circulation of aqueous. The classification is along the following lines:

1. Failure of osmotic forces (no mechanical closure of the chamber angle by iris): (a) arteriosclerosis of vessels afferent to Schlemm's canal (chronic simple glaucoma); (b) obstruction of the trabecular spaces, embracing glaucoma capsulare, pigmentary obstruction, blocking of trabecular spaces by cellular debris in iridocyclitis, and blocking by tumor growth; (c) increased protein in the aqueous in severe uveitis; (d) vascular changes in the angle, due to toxic effect of severe hemorrhage (hemorrhagic glaucoma), as in occlusion of the central retinal vein or in diabetic rubeosis.

2. Mechanical closure of the chamber angle by iris: (a) shallow-angle glaucoma, including the recurrent form of acute glaucoma formerly called "chronic congestive glaucoma," acute glaucoma due to intumescence of the lens, and dislocation of the lens into the anterior chamber; (b) obstructive glaucoma following operation for cataract; (c) late hemorrhagic glaucoma.

3. Irritation of ciliary processes in cases of posterior dislocation of the lens.

4. Lack of communication between the anterior and posterior chambers, in seclusion of the pupil or total posterior synechia.

5. Obstruction of venous drainage in closure of the vortex vein and in pulsating exophthalmos.

6. General vascular hyperemia, including the changes following concussion (traumatic glaucoma) and the histamine-like reaction of epidemic dropsy.

7. Congenital anomalies, including hydrophthalmos, juvenile glaucoma, and glaucoma associated with nevus flammeus or with neurofibromatosis.

John C. Long.

Troncoso, M. U. **The intrascleral vascular plexus and its relations to the aqueous outflow.** Amer. Jour. Ophth., 1942, v. 25, Oct., pp. 1153-1162. (10 illustrations, bibliography.)

9

CRYSTALLINE LENS

Haldimann, Carl. **Contribution to the subject of traumatic-rosette opacity of the lens.** Ophthalmologica, 1942, v. 103, May, p. 303.

Rosette opacities were described by Vogt in 1922. He believes that they occur only after trauma and take their

origin under the capsule. They are seen in the deeper cortical strata. When the trauma occurred long enough ago to have allowed new subcapsular lens fibers to develop over them, the opacities become pushed into the depths. Others have corroborated these findings, but it is the belief of Haldimann that some observations as to color and position have been neglected.

In several eyes seen soon after injury at the Bern Clinic, the superficial and deep opacities were visible simultaneously soon after the injury. The subcapsular opacities were lighter and grayish while the deeper opacities were yellowish, were entirely free from fiber striation, and were located in the strata between the most anterior part of the adult nucleus and the anterior band of disjunction. Each kind of opacity was strictly limited to its own zone of optical discontinuity; occasionally opacities were seen in corresponding parts of the posterior portion of the lenticular zone. In the course of months, the deeper opacities became plainer while the anterior ones often disappeared. Both were gradually pushed back.

F. Herbert Haessler.

Lawrence, R. D., Oakley, W., and Barne, I. C. **Temporary lens changes in diabetic coma, and other dehydrations.** The Lancet, 1942, v. 143, July 18, p. 63.

Temporary lens opacification occurred in two cases in association with the severe dehydration of diabetic coma, and also in two cases of severe dehydration from other causes. These lens changes seem to be directly dependent on dehydration and disappear when it is corrected by saline replacement. The part played by such water changes in the production of permanent diabetic cataracts is thought to be important in acute juvenile forms of the systemic disease, but of doubtful influence in the cataracts which develop in older diabetics.

Ralph W. Danielson.

Salit, P. W. **Seasonal variations in phospholipid content of crystalline lenses.** Arch. of Ophth., 1942, v. 28, Aug., p. 254.

Seasonal variations in the phospholipid content of 240 cataractous human lenses were studied. In general the phospholipids tend to be positively influenced by humidity and temperature but negatively by sunshine. Phospholipids in conjunction with cholesterol, on account of their mutually antagonistic behavior toward atmospheric conditions and humidity, must be important factors in water balance and consequently in regulation of the temperature of the tissues.

John C. Long.

10

RETINA AND VITREOUS

Argañaraz, Raul. **Retinal detachment.** Arch. de Oft. de Buenos Aires, 1941, v. 16, Sept., p. 465.

The author presents a general review of the subject under the following headings: etiology of idiopathic detachment, pathologic anatomy and pathogenesis of idiopathic detachment, symptomatic detachment, localization of tears, treatment.

Plinio Montalván.

Biro, Imre. **Spontaneous cure of detachment of the retina with tear.** Ophthalmologica, 1942, v. 103, May, p. 296.

In a 75-year-old man, a copious hemorrhage into the vitreous from a sclerotic vessel occurred. It was resorbed in ten days, and an extensive retinal detachment became visible, with a tear

as large as the disc in the upper nasal quadrant. Because of the patient's age and the condition of his vascular system, it was decided to forego surgical treatment. The eye movements were not even minimized by the use of occluding spectacles with small central holes. In the course of a few months, the retina became spontaneously replaced and the tear healed completely. From ability to count figures at 1 m., visual acuity rose to 5/7.

F. Herbert Haessler.

Friedman, Benjamin. **Unusual disciform retinal lesion with heterotopia maculae.** Arch. of Ophth., 1942, v. 28, Sept., p. 444.

The patient, a 27-year-old man, presented a unilateral retinal lesion and displacement of the macula downward and to the nasal side. The button-shaped retinal lesion was canary yellow in color and was covered by a membrane which extended into the vitreous. The lesion occupied the macular region, but the whole macular area was displaced downward and nasally. Corrected vision was 20/400. A scotoma corresponding in shape to the lesion was outlined and was found to be very close to the fixation point. Fixation with the abnormal eye demonstrated a large negative angle-alpha and a smaller positive vertical angle-alpha. The Bielschowsky after-image test indicated normal macular correspondence and showed a defect in the afterimage resulting from the retinal lesion. There is some likelihood that the disciform retinal lesion and the displaced macula both were caused by a birth injury.

John C. Long.

Haig, C., and Patek, A. J., Jr. **The relation between dark adaptation and the level of vitamin A in the blood.** Jour. Clin. Investigation, 1942, v. 21, July, p. 377.

The purpose of this study was to determine whether a relation exists between dark-adaptation measurements and the level of vitamin A and total carotinoids in the blood plasma in normal subjects and in patients with cirrhosis of the liver. The authors conclude that within either of these clinical categories no correlation is apparent between the plasma-vitamin-A level and either parameter of the dark adaptation function. (37 references.)

Ralph W. Danielson.

Harvey, R. A. **A rapid dark-adaptation test.** Radiology, 1942, v. 38, March, p. 353.

An inexpensive means of measuring dark-adaptation time is described. The author ingeniously exposes a film to graduated amounts of light by passing X rays through aluminum strips varying in thickness in a one-millimeter progression. The resulting film displays the varying density. The film is placed in a box with a fluorescent bulb behind it, or against a fluoroscopic screen. Light exposure time, fixed distances, and other definite factors must be set to make proper comparative tests. Results of the tests are given.

F. M. Crage.

Holm, Stig. **Macular proliferation (pseudotumor) and closely related pictures of disease (retinitis circinata, Coats's disease, etc.).** Acta Ophth., 1941, supplement 18, 90 pp.

This analysis consists of a detailed report of a case and a review of the literature, on the basis of which the author attempts to elucidate the pathogenesis of macular proliferation, the pathology of retinitis circinata, and the

relationship between macular proliferation and its allied ophthalmoscopic pictures. The case of macular proliferation, in a woman 82 years old, had in the macula a large greenish-white round plaque, 6 by 7 disc diameters, surrounded by circinate-like changes and small hemorrhages. There was a large central scotoma, and vision was reduced to light perception. The eyeball was enucleated on suspicion of a neoplasm.

On microscopic examination the macular plaque was found to consist of a mass of connective tissue, separated by a layer of proliferated pigmented cells into two parts, an inner layer poor in blood vessels, and an outer layer, adjacent to the choroid, richly supplied with blood vessels. Single pigmented epithelial cells were scattered through the mass, there was some free pigment, and massing of the pigmented epithelial cells occurred here and there. In elastin-stained slides fine elastic lamellae were found in the outer layer of the mass.

The retina adjacent to the pseudotumor had the nerve-fiber layer thickened, the nuclear layers merged, and the layer of rods and cones disordered. The retina overlying the pseudotumor had lost the rod-and-cone layer entirely, the layer of ganglion cells was present, and the nuclear layers were poor in nuclei. Close to the mass, the pigmented epithelial cells had proliferated into several layers and narrow fusiform cells with elongated nuclei appeared between the pigmented cells, increasing in number toward the mass. The retinal vessels had marked round-cell infiltration, and hyalinizing of their walls. The choroid exhibited no significant changes, beyond some sclerosis of the vessels. The lamina vitrea was normal. The arrangement of the cells leads the author to believe that the primary process is a disturbance in the pigment epithelium, which proliferates, and so stimulates the formation of connective tissue cells.

The circinate-like changes seen ophthalmoscopically were produced by subretinal fluid between the pathologic retina and the choroid, and by offshoots from the central fibrous mass in the form of small islands. This shows that the ophthalmoscopic picture of retinitis cincinata may be produced by pathologic processes other than the heretofore reported hyaline plaques, vacuoles, and fat cells. The close relation of macular proliferation to Coats's disease is demonstrated by a report of four cases, and its similarity to angiomatosis retinae, angioid streaks, exudative macular juvenile retinitis, and chronic central retinochoroiditis is suggested by a review of the literature.

On this evidence the author rejects the theories of Junius and Kuhnt, and maintains that the pathologic picture of macular proliferation represents a reaction of the retina to irritants, and is found in conditions of varying etiology. (13 illustrations, extensive bibliography.) Ray K. Daily.

Igersheimer, Joseph. **Retinal lipemia and visual disturbances associated with acromegaly and diabetes mellitus.** New England Jour. of Med., 1942, v. 226, May, 7, p. 754.

The author presents in considerable detail a case of acromegaly complicated by diabetes mellitus. Tumor of the hypophysis was suspected. Beside the usual signs and symptoms of diabetes mellitus the patient showed enlargement of the sella, bitemporal hemianopsia, vision which was reduced to hand movements, such field impairment that only a small area in the upper nasal quadrant of one eye re-

mained, and a definite retinal lipemia. Blood-chemistry tables included repeated estimates of total fat, cholesterol, and blood sugar. Urinary albumin and sugar determinations were kept.

Remarkable improvements in the vision, fields, and general condition following the administration of insulin and posterior pituitary alone and in combination are noted in detail. The retinal lipemia disappeared when the vision and fields were improved. These remissions were followed by setbacks in vision and fields especially after the medication was stopped.

A course of X-ray treatment, after all medicine had been discontinued for ten days, brought about remarkable improvement. The patient did not return for further X-ray treatment.

A diagnosis of tumor of the pituitary gland complicated by diabetes mellitus was made. The case showed a remarkable increase of total fat and cholesterol in the blood and a characteristic retinal lipemia.

The discussion of the case is rather rich in references to investigations both clinical and experimental, particularly those relative to diabetes in acromegaly. Similarities between pituitary diabetes and regular diabetes receive attention. One reference recommends the use of insulin to differentiate pituitary from ordinary diabetes, since insulin was found less effective in pituitary diabetes.

The improvement in all symptoms and disappearance of the retinal lipemia upon X-ray treatment of the pituitary gland after insulin had been stopped indicates that the pituitary lesion was related to the diabetes and especially to the retinal lipemia.

F. M. Crage.

Kravitz, Daniel. **Heparin in the treatment of thrombosis of the central retinal vein or of its branches.** Amer. Jour. Ophth., 1942, v. 25, Nov., pp. 1367-1368.

Lehrfeld, L., and Brav., S. S. **Angioid streaking of the retina.** Amer. Jour. Ophth., 1942, v. 25, Oct., pp. 1222-1224.

Roberts, J. L. **Heparin therapy in thrombosis of the central vein of the retina.** Ohio State Med. Jour., 1942, v. 38, April, p. 338.

Two cases are reported in which intravenous heparin was given. Treatment was started in one case on the sixth day and maintained adequately with very excellent results. Treatment on the second case was started late, and no improvement occurred.

Theodore M. Shapira.

Rothstein, J. L., and Welt, S. **Infantile amaurotic family idiocy: its relation to Niemann-Pick disease and other disturbances of lipoid metabolism.** Amer. Jour. Dis. of Children, 1941, v. 62, Oct., p. 801.

A rather extensive review of the literature and report of two cases of infantile amaurotic family idiocy with the results of histologic examination.

Theodore M. Shapira.

Vazquez Barrière, A. **Three-blade retractor for retinal detachment and orbital surgery.** Arch. de Oft. de Buenos Aires, 1941, v. 16, Sept., p. 533. (See Section 2, Therapeutics and operations.)

11

OPTIC NERVE AND TOXIC AMBLYOPIAS

Anthony, B. W., and Pollack, H. C. **Marble bones with pathologic fractures and bilateral optic atrophy in a Negro child.** Radiology, 1942, v. 38, March, p. 355.

A case of marble bones with patho-

logic fracture and bilateral optic atrophy in a 9-year-old colored girl is reported. The child had been blind since she was two years old.

X-ray examination revealed an extraordinary degree of sclerosis in all the pelvic bones and the ends of the femurs. It was a classical case of Albers-Schönberg disease. The findings in the films of the remainder of the skeleton are described, with special attention to the skull, where marked sclerosis of the base and constriction of the optic foramina were found. It was this proliferative process which caused progressive and complete blindness within three months at the age of two years. There was complete bilateral optic atrophy. F. M. Crage.

Haas, L. R. **Retrobulbar neuritis.** Jour. Kansas Med. Soc., 1942, v. 43, June, p. 244.

This paper reviews the literature quite thoroughly and discusses the condition in considerable detail. Four cases are reported. (43 references.)

Ralph W. Danielson.

Harrison, W. J. **A case report of osteoma of the orbits, resulting in bilateral optic atrophy.** Amer. Jour. Ophth., 1942, v. 25, Oct., pp. 1233-1236. (2 roentgenograms, references.)

Raman, T. K., and Abbu, C. **Lesion of the optic nerve in vitamin B_1 deficiency.** Jour. Indian Med. Assoc., 1941, v. 10, July, p. 417.

Investigations were carried out in a series of 34 cases. The clinical conditions were classified under the following heads: 1. Beriberi group of diseases: (a) Beriberi (15 cases). In this condition there is edema, cardiovascular disturbance, and peripheral neuritis. (b) Toxic peripheral neuritis (2 cases). Tachycardia and peripheral neuritis are present. (c) Avitaminosis B_1 (4 cases). Peripheral neuritis alone is present. 2. Pellagra (10 cases). 3. Beriberi with pellagra (1 case). 4. Diabetes mellitus (2 cases).

There was evidence of optic-nerve involvement in twenty cases. Three cases of beriberi and two of pellagra showed slight concentric contraction of fields. Five cases of beriberi, two of avitaminosis B_1, four of pellagra, one of beriberi with pellagra, and one case of diabetes mellitus showed definite concentric contraction. Temporal pallor was noted in one case of beriberi and one of pellagra. Primary atrophy was seen in two cases, one of pellagra and one of avitaminosis B_1. No correlation seemed to exist between the symptoms of peripheral neuritis and the lesion of the optic nerve.

A number of the case reports show interesting neurologic, serologic, and X-ray studies, particularly the avitaminosis-B_1-atrophy case. Visual fields improved in five cases under liberal diet and vitamin B_1. F. M. Crage.

12

VISUAL TRACTS AND CENTERS

Akelaitis, A. J. **Studies on the corpus callosum. 5. Homonymous defects for color, object, and letter recognition (homonymous hemiamblyopia) before and after section of the corpus callosum.** Arch. Neurology and Psychiatry, 1942, v. 48, July, p. 108.

In the routine preoperative study of 24 epileptic patients, in whom the corpus callosum was surgically sectioned by Van Wagenen, three were found for whom the results of routine perimetric studies were normal, but who showed a disturbance in the recognition of colors, objects, and letters in

one homonymous field. The present paper deals with these three patients. After analyzing these cases and integrating the information with the pertinent literature the author concludes that the localizing value of this type of homonymous defect is limited, and that complete or partial section of the corpus callosum produces no change in the hemiamblyopic visual field. (21 references.)

Ralph W. Danielson.

Clark, W. E. L. **The visual centers of the brain and their connections.** Physiological Reviews, 1942, v. 22, July, p. 205.

In recent years considerable experimental work has been done to help establish the finer details of the representation of the retina in the lower and higher visual centers of the brain and tracing of the route by which retinal impulses are carried to their destination. Some earlier conceptions regarding the diencephalic and mesencephalic terminations of the optic tract have been shown to be erroneous. Experimental psychologists using visual reactions in their studies of the process of learning and habit-formation established requirements which necessitated studies such as found in this article. Each portion of the visual pathway is treated separately. The more important anatomic details are described, and in numerous instances histologic data are included. The locations of the lesions in certain scotomas are given.

F. M. Crage.

Putnam, T. J., and Liebman, S. **Cortical representation of the macula lutea with special reference to the theory of bilateral representation.** Arch. of Ophth., 1942, v. 28, Sept., p. 415.

The rather confusing literature on cortical representation of the macula is reviewed. There is evidence in favor of extremely large representation of central vision at the posterior end and in the depths of the calcarine fissure and possibly also some representation in the anterior end of the fissure. There seems to be little evidence to support the idea that a callosal bundle unites one geniculate body with the striate cortex of the opposite side. Lesions of the anterior portion of the striate area on one side produce contralateral hemianopsia with preservation of much central vision. Lesions of the tip of the pole produce an irregular hemianopsia with very limited central vision. Total lesions of one occipital lobe either produce complete hemianopsia or may leave traces of central vision. Preservation of central vision in these lesions may be due to several factors. As central vision is probably represented over wide areas of visual cortex and as this area has three blood supplies, complete destruction of the area does not easily occur. Possibly a shift in the fixation point prevents hemianopsia from seeming complete in the macular area. It is likely that after occipital lesions a certain degree of visual perception is taken over by lower visual centers, as occurs in monkeys.

John C. Long.

Sloan, L. L. **The use of pseudo-isochromatic charts in detecting central scotomas due to lesions in the conducting pathways.** Amer. Jour. Ophth., 1942, v. 25, Nov., pp. 1352-1356. (4 illustrations, 1 table.)

13

EYEBALL AND ORBIT

Bruckner, R. **A malformation of the external adnexa of the right eye.** Ophthalmologica, 1942, v. 103, June, p. 355.

(See Section 14, Eyelids and lacrimal apparatus.)

Harrison, W. J. **A case report of osteoma of the orbits resulting in bilateral optic atrophy.** Amer. Jour. Ophth., 1942, v. 25. Oct., pp. 1233-1236. (2 roentgenograms, references.)

Windham, R. E. **A case of exophthalmos in a newborn infant.** Amer. Jour. Ophth., 1942, v. 25, Oct., p. 1236. (One illustration.)

14

EYELIDS AND LACRIMAL APPARATUS

Brückner, R. **A malformation of the external adnexa of the right eye.** Ophthalmologica, 1942, v. 103, June, p. 355.

The author describes a malformation of the region of the right eyebrow, upper lid, fornix, and cornea, with ptosis. In preparations of tissue taken for biopsy, proliferated Schwann cells, sweat glands, fat cells, connective tissue, and muscle fibers were found. These tissues are believed to be aberrant and to have wandered subconjunctivally to their ultimate sites. The most probable explanation of this occurrence is the assumption of injury to the lateral frontal process at the end of the first month of fetal life. This is assumed to have led to faulty differentiation of the ectoderm secondary to aberrant development of the muscle and disturbance of corneal development. The primary mechanism is compared to that of Recklinghausen's disease, but the possibility of idioplastic germ-cell abnormality is mentioned.

F. Herbert Haessler.

Montgomery, R. M., and Walzer, E. A. **Tinea capitis with infection of the eyelashes.** Arch. Dermatology and Syphilology, 1942, v. 46, July, p. 40.

The authors review the literature on the few cases of tinea ciliorum that have been reported. They then report the only case in which the eyelashes were found to be infected among 560 cases of tinea capitis seen at the New York Postgraduate Medical School over a period of 6½ years. The patient, an 11-year-old boy, had grossly visible lesions on the scalp, but it was only upon examination by filtered ultraviolet light that the lashes were found to be infected. Under this light the hairs were seen to fluoresce. Cultures on Sabouraud's medium revealed M. audovini from both the scalp and the lashes. The scalp was treated with roentgen rays and the lashes by epilation and by application of yellow mercuric-oxide ointment. The case was cured in three months. (7 references, 3 figures.) Ralph W. Danielson.

15

TUMORS

Barlow, Aaron. **Primary sarcoma of the choroid.** Amer. Jour. Ophth., 1942, v. 25, Nov., pp. 1337-1340. (2 illustrations.)

Fowler, J. G., and Terplan, K. L. **Fibroma of the orbit.** Arch. of Ophth., 1942, v. 28, Aug., p. 263.

A white woman aged 23 years was examined because of protrusion of the left eye. Moderate degrees of exophthalmos and papilledema were noted on this side. A firm mass could be felt connected with the eyeball. During roentgen-ray treatments, the tumor increased in size. A conjunctival incision was made over the mass in the inferior temporal quadrant and the tumor grasped with forceps. The patient squeezed the lids violently because of pain and the tumor mass was completely extruded by this proceeding. Healing was uneventful, and on ex-

amination five years and two months after operation the eye was found to be entirely normal, without any evidence of recurrence. The tumor was a well-encapsulated egg-shaped mass measuring 2.4 by 2 by 1.8 cm. A microscopic diagnosis of fibroblastoma was made.

Sixteen cases of orbital fibroma are reported in the literature. Evisceration of the orbit was done in five of these cases. The authors recommend removal of such tumors through conjunctival incisions. John C. Long.

Harlowe, H. D. **Primary malignant melanoma of the choroid.** Minnesota Med., 1942, v. 25, May, p. 366.

Report of a case with metastasis. There was an interval of six years between enucleation of the eye and metastasis to the liver. The patient is still living, five months after the exploratory surgery. Theodore M. Shapira.

Heuven, van, G. J. **Leiomyoblastoma iritis.** Ophthalmologica, 1942, v. 103, May, p. 308.

In the iris of a woman who came on account of presbyopia was seen a large nevus which as to clinical appearance was remarkable only in that the edge was pale and glassy. When seen again several months later, the glassy portion seemed more swollen and it was thought wise to enucleate the eye. A study of the section revealed a complex tumor that contained not only cells similar to those of the sphincter and to nevus cells but also some cells with clumps of pigment of unknown but possibly retinal origin and some neurofibrils. The organized and therefore teratoid character of the tumor is emphasized. F. Herbert Haessler.

McKee, S. H. **Primary sarcoma of the iris (malignant melanoma).** Arch. of Ophth., 1942, v. 28, Aug., pp. 197-204.

The iris is the least frequent site of malignant melanoma of the uvea. The incidence of this condition in the choroid, ciliary body, and iris is about as 85 to 9 to 5. The origin of the tumor is discussed with favor shown the neuroectodermal theory of Masson and Theobald. Three cases of malignant melanoma of the iris are reported with pathologic description of these tumors. Two of the patients were women aged 41 and 53 years respectively and the third patient was a man aged 69 years. Only one of the three patients came to consultation because of the tumor. In the other two the tumor was observed during routine examination of the eyes. (3 illustrations, bibliography.) John C. Long.

Sniderman, H. R. **Orbital metastasis from tumor of the pancreas.** Amer. Jour. Ophth., 1942, v. 25, Oct., pp. 1215-1221. (5 photomicrographs, references.)

16

INJURIES

Bischler, Vera. **Considerations of metallic impregnations of the cornea apropos of a case of professional argyrosis.** Ophthalmologica, 1942, v. 103, May, p. 281.

In a seventy-year-old silver-engraver who presented himself for prescription of glasses, a striking corneal manifestation was observed. On the posterior surface of each eye were innumerable pigment particles which in one eye were distributed in the form of a ring like the typical Kayser-Fleischer ring, and in the other eye covered the entire surface. Hepatolenticular degeneration could be ruled out and no source of metallic poisoning other than the pro-

fessional contact with silver could be found. It was concluded that the corneal phenomenon was evidence of an occupational argyrosis. The author reviews the literature of cases of argyrosis, chrysosis, and chalcosis. (Bibliography 1½ pages, colored plate of corneal lesion.) F. Herbert Haessler.

Cross, A. G. **Gas-gangrene of the eye.** The Lancet, 1941, v. 241, Nov. 1, p. 515.

Twelve cases are reported. All had perforating injury, and in seven there was an intraocular foreign body. Panophthalmitis was present in all cases within 48 hours after the injury. There was severe pain but little general disturbance.

Removal of the foreign body had no effect on the progress of the condition. Evisceration was performed in 11 cases and enucleation in one. Clostridium welchii was isolated from all the eyes. In two there was staphylococcus contamination.

The organism may be present on the foreign body, on the object causing the injury, on the lashes, or in the conjunctival sac. Recovery was always prompt and no deaths have been reported from this condition.

F. M. Crage.

Haldimann, Carl. **Contribution to the subject of traumatic-rosette opacity of the lens.** Ophthalmologica, 1942, v. 103, May, p. 303. (See Section 9, Crystalline lens.)

Spaeth, E. B. **The removal of metallic foreign bodies from the eyeball and from the orbit.** Jour. Amer. Med. Assoc., 1942, v. 120, Oct. 31, p. 659.

The author discusses the value and importance of roentgenograms both flat and stereoscopic in the diagnosis of foreign bodies in the globe and in the orbit. Injection of air into Tenon's capsule will sometimes help to determine whether the foreign body is just within or outside the globe. The use of radiopaque solutions and appliances is not highly recommended for diagnostic localization. Rather, they furnish fixed external surface landmarks from which exact measurements can be made to permit the removal of nonmagnetic foreign bodies. The use of and the indications for the biplane fluoroscope are discussed as well as the use of magnets and the endoscope. (13 figures, discussion.) George H. Stine.

17

SYSTEMIC DISEASES AND PARASITES

Anderson, W. B. **Virus diseases affecting the eye and adnexa.** North Carolina Med. Jour., 1941, v. 2, Nov., p. 592.

The article is largely a discussion of the author's experiences with patients exhibiting certain ocular signs and symptoms associated with signs and symptoms in other systems of the body. This combination existed as a known disease group hundreds of years before the isolation of the first virus.

As to the nature of viruses the author quotes from Rivers' Lane medical lecture of 1939. Because of a certain broad similarity in the pathologic picture, namely, the exhibition of a marked tissue specificity, virus diseases have assumed a definite grouping.

Upon the basis of tissue specificity, virus diseases affecting the eye fall into these three groups: those having a neurotropic selectivity; those having a dermatotropic selectivity; and those having an affinity for uveal tissue, per-

haps a chromatic specificity (mesodermatropic).

In the neurotropic group encephalomyelitis receives the greatest attention. It may be a most unwelcome complication of such virus diseases as variola, vaccinia, epidemic parotitis, varicella, measles, pertussis, and antirabies inoculation. The chief ocular manifestations of this disease are cranial nerve paralysis, amaurosis, temporary achromatopsia, and papilledema. Peculiarly vulnerable is the papillomacular bundle. Horner's syndrome and accommodative failure have been seen. Other virus nervous diseases are poliomyelitis and epidemic encephalitis but their ocular symptoms are rare.

Ocular diseases due to viruses having a dermatotropic tendency are grouped according to the lesion produced on the skin and mucous membranes. In one group vesicles exist, in the other there is follicle formation. In the first group are herpes simplex, herpes zoster, and vaccinia. Under herpes simplex are listed dendritic, superficial punctate, and other forms of keratitis. In the second group are inclusion blennorrhea, trachoma, Parinaud's syndrome associated with a positive Frei test, and molluscum contagiosum.

Dendritic keratitis is selected as the ocular lesion typical of the vesicular group. Sixty percent of the cases give a definite antecedent history of infection, usually upper respiratory. The clinical picture, progress, and treatment are amply described. The entity herpes zoster ophthalmicus is treated in like manner.

In the discussion on the diseases producing follicles, sulfanilamide success in trachoma favors those who contend that the disease is not caused by a virus.

Macnie's report on a series of cases of follicular conjunctivitis resembling Parinaud's conjunctivitis, and his statement that the virus of lymphogranuloma venereum is one of the causes of the oculoglandular syndrome of Parinaud, encourage the author to suggest the simple Frei test on any patient with follicular conjunctivitis of unknown etiology.

A separate, interesting, and puzzling final group is one in which the uveal tract is affected by a granulomatous process resembling a tubercle but without the bacillus or central caseation. Other organs are involved in these syndromes. Some examples are uveoparotid fever, sarcoid of Boeck, and uveitis with alopecia and other symptoms. No claim is made that the diseases of this group are of known virus etiology. They have many of the characteristics of tuberculosis and are classified as paratuberculous. This means an allergic reaction to a tubercle strain of low virulence in an individual whose immunity to the organism is high.

F. M. Crage.

Hedges, H. S., and Humphries, M. K., Jr. **Conjunctival myiasis due to Oestrus ovis.** Arch. of Ophth., 1942, v. 28, Aug., p. 251.

A patient was struck in the right eye by a fly, while working in Virginia. Within two hours there were itching and lacrimation and a crawling sensation in the conjunctival sac. A number of actively motile larvae were seen moving about on the conjunctiva and cornea. Many were removed manually. Two-percent silver nitrate was instilled, but had no effect on the motility of the larvae. The eye was next bathed continuously with mineral oil, and the following morning a few less active larvae were removed, increasing

to fifty the total number of organisms found. The eye made an uneventful recovery. The insect was probably Oestrus ovis, the sheep gadfly. The larvae are deposited by the insect while it is flying. John C. Long.

Preston, H. G. **Ocular tuberculosis.** Virginia Med. Monthly, 1941, v. 68, July, p. 400.

A brief review of ocular tuberculosis is presented and four cases are reported. Theodore M. Shapira.

18

HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Dester, L. R. **Children's services in sight conservation.** Sight-Saving Review, 1942, v. 12, June, p. 110.

The article describes the role of the child-welfare division in Oklahoma in conserving the sight of the needy children in that state. Individual cases observed by the author are cited. Success required coöperation between medical-social worker, physician, teacher, parents, relatives or guardians, and community. F. M. Crage.

Gardiner, E. G. **Demonstrations of medical social work in eye clinics.** Sight-Saving Review, 1942, v. 12, p. 125.

The National Society for the Prevention of Blindness has carried on demonstrations of medical social work in eye services as a means of conserving the sight of patients. By placing in eye clinics fully prepared medical social workers with knowledge of eye health, the problem of patients with serious eye pathology failing to return for treatment was partly solved.

The plan was for the hospital desirous of trying out medical social work as an integral part of clinical ophthalmology to request the National Society for the Prevention of Blindness to supply a worker; and also to request financial assistance in paying the salary of the worker for a period of one to three years. The exact proportion of salary carried by the hospital and by the society varied.

The requirements and training of those desirous of doing this work are discussed. F. M. Crage.

Lebensohn, J. R. **Ocular dominance and marksmanship.** United States Naval Med. Bull., 1942, v. 40, July, p. 590.

The author started the present investigation because soldiers who complained of not being able to sight a gun with the right eye were found to be left-eye dominant. One's master eye is more or less associated with his hand preference and cerebral dominance. With suitable tests ocular dominance is almost universally demonstrable. After ocular dominance is established in an individual it is seldom reversed. The dominance will be maintained even with a deterioration of visual acuity, providing the latter remains above 6/20. In the present investigation sixteen companies of untrained recruits, totaling 1,768 men, were studied at a 200-yard course and it was found that the purely dextral men made the best showing, and the purely sinistral the worst. This poor performance of the left-handed was anticipated, as the Springfield bolt-action rifle is designed for the right-handed, and only from the right shoulder can it be safely and efficiently used. Of the 856 right-handed

marksmen, 84 percent were right-eyed and 16 percent were left-eyed. The mean score for the right-eyed was 30.7, and for the left-eyed 26.5.

The author quotes two previous papers. Banister found that in 1,000 experienced infantrymen 69 percent of the right-eyed qualified as first class marksmen against 54 percent of the left-eyed. Doyne concluded that ocular dominance did not affect marksmanship adversely when the rifleman was trained to shoot with both eyes open.

In binocular sighting, the impressions from the two eyes are synthesized along a mental line of vision, as is readily illustrated by a few simple experiments: a. Hold a tube with the right hand and look through it with the right eye while the left palm is held alongside its distal end. A startling effect results, as the scenery is now seen through a hole in the hand. b. Close the nondominant eye and with a finger before the dominant eye block out from view some object across the room. On opening the nondominant eye the object is clearly seen through the apparently transparent finger. c. The last experiment is to be tried on the firing range. Place in front of the rifle sights a card obstructing the view between the sights and target. With both eyes open you will see the target through an apparently transparent card, and if the aim is true you should score a bull's-eye, even though the target is seen with one eye and the sights with the other.

With both eyes open the marksman has a clearer view of the bull's-eye, estimates distance and direction better, and shoots faster and with less sense of strain. The recruit should concentrate primarily on the target; secondarily on the sights, as the sights need only be distinct enough to produce a definite impression. (10 references.)

Ralph W. Danielson.

Preston, F. E. **Importance of night-vision tests.** Brit. Med. Jour., 1942, June 27, p. 800. (See Section 1, General methods of diagnosis.)

Rutherford, C. W. **Sight restoration in Indiana as conducted by the State Department of Public Welfare.** Sight-Saving Review, 1942, v. 12, June, p. 103.

The present law for assistance to the blind in Indiana became effective July 1, 1936. The department approved treatment, where a reasonable chance to restore vision existed as in cataract, to stabilize vision without further loss as in glaucoma, or to prevent the onset of blindness even though vision shows little impairment at the time of application as in pterygium.

Men over 21 and women over 18 years are eligible for permanent blind aid. The applicant should have central vision of 20/200 or less, or in those with better vision the fields should show contraction with the widest diameter of the better eye not greater than twenty degrees. Eye treatment for prevention of blindness includes cases with better vision than that above stated.

The duty of the State Supervising Ophthalmologist in clearing up doubtful cases is discussed. Most of the applicants are over fifty years of age. They are low in physical vitality, poorly nourished, live in unhygienic surroundings, and often are devoid of ambition to see better. Others, for various reasons, are against medical care and doctors. The author discusses cataract, glaucoma, trachoma, pterygium, and the application of glasses in the wel-

fare cases. Trachoma results from the sulfanilamide group seemed discouraging. F. M. Crage.

Selling, L. S. **The ophthalmologist's place in the prevention of traffic accidents.** Jour. Amer. Med. Assoc., 1942, v. 120, Sept. 26, p. 261.

The author feels that the ophthalmologist's duty in the traffic situation is to work for establishment of visual standards and evaluation of individual cases, and also for reconsideration of the whole picture in order to determine the effect of different ocular conditions and defects on the driver's ability. (Discussion.) George H. Stine.

Snell, A. C. **The need for a more realistic ophthalmic service in industry.** New York State Jour. Med., 1942, v. 42, Aug. 1, p. 1435.

This is part of a symposium on industrial ophthalmology in the war effort. The author discusses visual conditions in industry, obligations of the industrial ophthalmologist, and methods of visual testing.

Theodore M. Shapira.

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ANATOMY, EMBRYOLOGY, AND COMPARATIVE OPHTHALMOLOGY

Minsky, Henry. **Concept of zonular chamber.** Arch. of Ophth., 1942, v. 28, Aug., pp. 214-217.

Gross examinations of the fresh eye combined with injection experiments have shown evidence of a structure posterior to the zonule. This structure, called the hyalozonular leaf, has an insertion in the posterior capsule of the lens independent from that of the posterior zonular leaf. It arches over the face of the vitreous to reach a point midway between the ora serrata and the posterior tips of the ciliary processes. A newly described space, called the zonular chamber, is bounded in front by the posterior surface of the combined anterior and posterior leaves and in back by the anterior surface of the hydrozonular leaf. The author suggests that the eye be described as having five chambers: the anterior chamber, the posterior chamber, Hannover's canal, the zonular chamber, and the vitreous chamber. (One drawing.)

John C. Long.

PAN-AMERICAN NOTES

Edited by Dr. M. Uribe Troncoso
500 West End Avenue, New York

Miscellaneous

The National Society for the Prevention of Blindness offers a prize of $250.00 for the most valuable original contribution, adding to existing knowledge about the early diagnosis of glaucoma, during 1943.

The award will be made through the National Society for the Prevention of Blindness, under the guidance of an ophthalmologic committee composed of Drs. Arnold Knapp, Manuel Uribe Troncoso, and Mark J. Schoenberg.

Papers may be presented by any research worker, student in ophthalmology, or ophthalmologist of the Western Hemisphere. They may be written in English, French, German, Italian, Spanish, or Portuguese. Papers written in the last four languages should be accompanied by a translation in English.

Papers should be in the offices of the National Society for the Prevention of Blindness, 1790 Broadway, New York City, by September 15, 1943.

The New York Academy of Medicine has elected as corresponding fellows 57 of the most distinguished physicians and surgeons in many countries of Latin America.

Anais do IV. Congresso-Brazileiro de Oftalmologia

The editor has just received the first volume of the Transactions of the IV. Brazilian Congress of Ophthalmology, which was held in Rio de Janeiro in June-July, 1941. This volume will be followed by two more. It contains nearly 500 pages and reports the proceedings of the Inaugural Session of the Congress with addresses from official delegates, from Brazilian states, societies, and foreign delegates, including one by Dr. H. S. Gradle of Chicago. Then follow the papers presented at the meeting of "Social ophthalmology," nine of them, including Prevention of blindness in schools, in agricultural workers, and Visual requirements of public and railroad employes, and in aviation. From the meetings of Clinical Ophthalmology 23 papers are reproduced, which include such different subjects as glaucoma, cyclodialisis and pterygium operations, retinal diseases, and others.

Societies

The Medical Association of the Penido Burnier Institute, of São Paulo, Brazil, announces the election of the new officers for the year 1942-43, as follows: president, Dr. Gabriel Oliveira da Silva Porto; first secretary, Dr. Penido Burnier, Jr.; second secretary, Dr. Cit Marques da Silva; secretary-treasurer, Dr. Leoncio de Souza Queiroz; editorial committee of the Arquivos do Instituto Penido Burnier (the Association's official publication): Drs. Penido Burnier, Guedes de Melo, Jr., and Monteiro Sales.

Obituaries

Dr. Andres Martinez, a well-known ophthalmologist of Mexico City, died at middle age in September, 1942. He was the ophthalmologist who later became director of the "Hospital de Jesus," the oldest hospital in North America, founded by Hernan Cortes, the conqueror of Mexico, about 1523. Dr. Martinez also was for many years the ophthalmologist of the Spanish Hospital of Mexico City. He enjoyed a large practice by his devotion to his patients, especially those in moderate circumstances. He was a good surgeon and always active in behalf of professional progress in ophthalmology, stimulating younger colleagues by assisting in postgraduate courses by native or foreign teachers. Although he did not write much he was assiduous in practicing new methods and ideas in his clinic.

Dr. Manuel Balado, Professor of Neuro Surgery at the University of Buenos Aires and one of the outstanding figures in his specialty, died at the early age of 47 years, in the midst of a great scientific activity. He was in the United States for some time and studied at the Mayo Clinic, in Rochester, Minnesota. Besides his neurologic work he made many contributions to ophthalmology. His paper on the nervous mechanism and functions of the iris, and his new method of coloration of the nerve fibers in the iris, was rewarded by a medal of the Buenos Aires Faculty of Medicine.

He made a careful description of the optic paths in the brain, which is considered one of the best and most complete in medical literature. He studied also the external geniculate body in a paper that was later condensed into the well-known book he published in Berlin, in 1937, with the collaboration of Dr. E. Frank. Professor Balado made also an excellent description (with Androgué) of the chiasm and of the cortical localization of the macula.

He was the originator of the method of ventriculography with iodine for the examination of tumors of the brain.

He wrote three books in Spanish: Neuro-

logical surgery; Surgical treatment of hypophyseal and perihypophyseal tumors (in collaboration with Pardal); and the volume on neuro-surgery in the "Treatise of surgical therapy" (in collaboration with Professor Arce). He was the founder and director of the Archivos Argentinos de Neurologia and read many papers at neurologic congresses.

NEWS ITEMS

Edited by Dr. Ralph H. Miller
803 Carew Tower, Cincinnati

News items should reach the editor by the twelfth of the month.

Deaths

Dr. Lewis C. Wessels, Philadelphia, Pennsylvania, died September 4, 1942, aged 81 years.

Dr. Amos D. Wood, Bluefield, West Virginia, died September 14, 1942, aged 73 years.

Dr. Leon Edgar Norfleet, Tarboro, North Carolina, died September 12, 1942, aged 78 years.

Dr. Joseph C. Beck, Chicago, Illinois, died October 20, 1942, aged 72 years.

Dr. Steuart B. Muncaster, New York, New York, died September 11, 1942, aged 85 years.

Dr. Thomas E. Bullard, Schuylerville, New York, died September 19, 1942, aged 79 years.

Dr. Parker M. Ward, Houlton, Maine, died September 8, 1942, aged 69 years.

Dr. George S. Barger, Purcell, Oklahoma, died September 15, 1942, aged 67 years.

Dr. Frank Vinsonhaler, Little Rock, Arkansas, died September 1, 1942, aged 78 years.

Dr. Ernest D. Everett, Lakeview, Oregon, died August 16, 1942.

Dr. Arthur F. Daly, Chicago, Illinois, died September 13, 1942, aged 47 years.

Dr. Joseph R. Dillinger, French Lick, Indiana, died August 16, 1942, aged 66 years.

Dr. George A. Dennis, Montgomery, Alabama, died July 21, 1942, aged 69 years.

Dr. Frank W. Marlow, Syracuse, New York, died October 4, 1942, aged 84 years.

Dr. Robert James Lawler, Elmira, New York, died October 1, 1942, aged 59 years.

Dr. Allen Greenwood, Boston, Massachusetts, died October 23, 1942, aged 76 years.

Dr. Samuel P. Oast, New York, New York, died October 16, 1942, aged 55 years.

Dr. Clarence A. Hercules, Harvey, Illinois, died October 24, 1942, aged 64 years.

Dr. William H. Kirk, Pittsburgh, Pennsylvania, died October 12, 1942, aged 71 years.

Dr. Luella M. Masters, Thorntown, Indiana, died October 7, 1942, aged 81 years.

Dr. Robert S. Curry, Jackson, Mississippi, died August 20, 1942, aged 80 years.

Dr. Mary Louise Lines, Brooklyn, New York, died October 5, 1942, aged 83 years.

Dr. Charles Peter Frantz, Burlington, Iowa, died August 21, 1942, aged 73 years.

Dr. Frederick W. Luhman, Pender, Nebraska, died August 10, 1942, aged 63 years.

Dr. Donald L. MacKinnon, Truro, Nova Scotia, Canada, died August 1, 1942, aged 68 years.

Dr. George S. Row, Indianapolis, Indiana, died July 8, 1942, aged 75 years.

Dr. George F. Brooks, Stillwater, Minnesota, died October 7, 1942, aged 64 years.

Dr. Harry T. Harr, Fayetteville, Arkansas, died in September, 1942, aged 73 years.

Dr. Luther C. Peter, Philadelphia, Pennsylvania, died November 12, 1942, aged 73 years.

Dr. Edward C. Fabre-Rajotte, San Francisco, California, died September 14, 1942, aged 67 years.

Dr. Jacob Hyman, Los Angeles, California, died September 9, 1942, aged 71 years.

Dr. Lionel C. Albert, Yonkers, New York, died September 6, 1942, aged 52 years.

Dr. J. Brown Loring, Chicago, Illinois, died November 6, 1942, aged 81 years.

Dr. Henry Stevenson Wailes, Salisbury, Maryland, died October 16, 1942, aged 69 years.

Miscellaneous

A postgraduate course in Ocular Surgery, Pathology, and Orthoptics will be given by the George Washington University School of Medicine, 1335 H Street, N.W., Washington, D.C., on Monday, February 15, to Saturday, February, 20, 1943, inclusive.

Surgery. The registrants will perform operations on animals eyes under direction of the instructors. The following operations will be performed: Combined intracapsular cataract extraction; Elliott's sclero-corneal trephining; Cyclodialysis; Lagrange; Iridectomy, iridotasis, iridencleisis; Jameson recession, Reese resection, Worth advancement, and O'Connor cinch.

Instructors: Drs. William Thornwall Davis, Ernest Sheppard, E. Leonard Goodman, Walter J. Romejko, Ronald A. Cox, Sterling Bockoven, Richard W. Wilkinson, C. R. Naples, and Clifford A. Swanson, Commander (MC), U.S.N.

Place: The George Washington School of Medicine, 1335 H Street, N.W.

Time: 3:30 to 5:30 p.m., Monday through Friday, February 15 to 19, 1943.

Pathology. The course embraces normal histology of the eyes; inflammations, general and specific; phthisis bulbi; glaucoma; cataract; arteriosclerosis; albuminuric retinitis; and intraocular and epibulbar tumors.

Instructors: J. E. Ash, Colonel (MC), A.U.S., curator, The Army Medical Museum; Alfred Golden, Captain (MC), A.U.S.; Helenor Campbell Wilder; and Lawrence T. Ambrogi.

Place: The Army Medical Museum, Seventh and Independence Avenue, S.W.

Time: 9:00 a.m. to 12:00 m., Monday through Friday, February 15 to 19, 1943.

Orthoptics. Practical orthoptics with case demonstrations.

Instructors: Drs. William Thornwall Davis, Ernest Sheppard, and Frank D. Costenbader; Louisa Wells, Elizabeth K. Stark, Debora Dicke, and Dorothy R. Bair.

Place: The George Washington School of Medicine, 1335 H Street, N.W.

Time: 1:15 to 3:15 p.m., Monday through Friday, February 15 to 19, and Saturday morning 9:00 to 11:00 a.m., February 20, 1943.

Registration. The fee for the course is $100.00, $25.00 payable with registration, the remainder payable on matriculation. Make checks payable to The George Washington University. Register at the School of Medicine, 1335 H Street, N.W., Monday, February 15th, from 7:30 to 8:30 a.m.

For information apply to the secretary, Miss Louisa Wells, 927 Seventeenth Street, N.W., Washington, D.C.

The following changes in the faculty of the Department of Ophthalmology of the New York University College of Medicine were announced: Dr. W. Guernsey Frey, Jr. was appointed Assistant Clinical Professor of Ophthalmology, and Dr. Frank C. Keil was appointed Assistant Clinical Professor of Ophthalmology; Dr. Conrad Berens was promoted from Associate Professor of Ophthalmology to Professor of Ophthalmology; Dr. Daniel B. Kirby remains Professor of Ophthalmology and Chairman of the Department.

A course in medical aspects of gas warfare was given under the auspices of the Columbus, Ohio, Academy of Medicine and the Ohio State University College of Medicine, on November 16th, 23d, and 27th. The instructor in ophthalmology was Dr. Albert D. Frost, Columbus, Ohio.

The following committee on the conservation of vision was recently appointed by Dr. Richard O. Rogers, Bluefield, West Virginia, president of the West Virginia State Medical Association: Drs. Virgil E. Holcombe, Welch England, and Raymond A. Tomassene. This committee was formed for the purpose of cooperating with the National Society for the Prevention of Blindness.

Societies

The Brooklyn Ophthalmological Society held its regular meeting on December 17, 1942, at the Towers Hotel. Preceding the executive session the following papers were presented: "Contact glasses in corneal conditions" by Dr. Arno E. Town, and "Corneal dystrophies" by Dr. Ralph I. Lloyd.

At the annual meeting of the Southern Medical Association held November 10th to 12th, Dr. Clyde A. Clapp spoke on "Compensatory divergent strabismus: Its etiology and treatment."

The Oklahoma City Clinical Society held its twelfth annual fall conference October 26th to 29th. Among the guest speakers, representing ophthalmology, was Dr. Andrew W. McAlester of Kansas City.

The Post-Graduate Medical Assembly of South Texas held its eleventh annual meeting from December 1st to 3d. The guest speaker at the section on ophthalmology was Dr. Meyer Wiener, Saint Louis.

At the meeting of the Washington, D.C., Ophthalmological Society on November 23, 1942, Dr. Edmund B. Spaeth, the guest speaker, discussed "Surgery of the lacrimal apparatus" and "War injuries." The following cases were presented: "Keratoconus corrected with contact lenses," by Dr. Sterling Bockoven; "Accommodative convergent squint combined with divergence excess," by Dr. William Thornwall Davis; "Traumatic dislocation of lens with prolapsed vitreous and iridic adhesions," by Dr. E. Leonard Goodman; "Cystic degeneration of the retina," by Dr. John R. Lloyd; and "A case of interstitial keratitis," by Dr. J. A. Sansoucy.

Personals

Dr. Vail reports that he is well and comfortable, and says: "The work is interesting and there is a lot to do in the way of inspections, etc. I have seen a few interesting consultation cases. The boys are well taken care of, and there are few criticisms. Ophthalmic care and investigation have a very important role in this war, more than is generally realized. It is most important that men have good vision in order to read the dials of all the delicate instruments, etc."

Dr. A. B. Bruner of Cleveland, Ohio, was guest speaker at the December meeting of the Cleveland Ophthalmological Club. The title of his presentation was "Ocular malingering."

PRESCRIPTION OPTICIANS